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THE IRON TRADE REVIEW

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Improvement Comes Slowly

But a Large Volume of Business is Pending and Prices on Most Products Are Maintained, With Some Advances

The volume of business in finished materials is increasing and general conditions are improving, but the change is not decided and certainly is not as encouraging as were the developments of the first two weeks of last January. It is recalled, however, that the improvement a year ago was short-lived and flattened out after a few weeks, and hope is entertained that if the improvement comes more gradually this year, it will continue until it reaches a very large volume, to be maintained for a long period. The Steel Corporation has been able to increase its capacity slightly and there will be a further increase next week, but active capacity is still under 50 per cent.

Pig Iron

Demand for pig iron continues very light throughout the country, but is somewhat better in the east and Chicago than in Pittsburgh and other points in the central west. Buyers are no longer able to give the excuse of inventory-taking and it is expected that there will be more buying soon.

Railroad Buying

Railroad buying has developed rather slowly, but considerable business is pending, including about 300,000 tons of rails, principally for eastern roads. The Pennsylvania railroad, noted for the severity of its specifications for steel rails, has caused surprise by demanding requirements more severe than ever before. The most important feature of the new specifications is that the rails shall be rolled from blooms which have been allowed to cool to atmospheric temperature before being re-heated for the final rolling. Conferences of Pennsylvania railroad men and steelmakers promise to result in a speedy agreement and the early placing of at least a part of the tonnage. The principal car order for the week was 1,000 hoppers for the Baltimore & Ohio, awarded to the Cambria Steel Co., and 1,000 box cars for the same road awarded to the Mt. Vernon Car & Mfg. Co. Some heavy orders for track fastenings have been placed. The Illinois Central has awarded 25 locomotives to the Lima Locomotive Works.

Prices

In finished materials, the price situation is fairly satisfactory to sellers of most products, as the 1.10c quotation on shapes, plates and bars for delivery any time up to April 1 is being maintained and on some products higher quotations prevail. Recent improvement in buying of cast iron pipe has enabled makers to obtain higher prices in some cases, but irregularities continue. Prices of wire nails and plain wire have been advanced $1 a ton, but wire rods are still obtainable at $25, Pittsburgh. Somewhat higher prices are being obtained on billets and sheet bars.

Sheets

Cutting in prices of sheets continues to be the feature of the market. This includes galvanized, in spite of the higher prices of spelter. There is, however, more activity in Pittsburgh, where mills have been receiving heavier specifications.

Coke and Scrap

The production of coke last year amounted to 14,075,638 tons, a loss of 6,012,263 tons compared with 1913. The scrap market has recorded advances at several centers, but dealings are confined largely to activities of brokers in some markets, and the new prices are not thoroughly established.

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The President's "Scoop"

THE intensely partisan feeling manifested by the President in his speech at Indianapolis certainly is to be deplored. If it had been made in the heat of a campaign, there would have been more excuse for some of the extravagant statements made, and his attitude is especially to be regretted during a great European war, when all patriotic citizens, regardless of party, are sorry to have anything interfere with their giving loyal support to their President and his foreign policies. It is indeed surprising that the President descended in some of his utterances to the level of a reckless stump speaker.

We do not intend to comment on the President's speech in any partisan way, for this is not a partisan paper, but we wish to call attention particularly to one paragraph, that relating to the tariff, which is of vital interest to iron and steel manufacturers. He said that if by scientific treatment of the tariff is meant adjustment of the actual trade conditions of America and the world, he wishes to call attention to the fact that the bill creating the federal trade commission "does that very thing". Then the President adds, "We were at pains to see it was put in there." In other words, the President has broken the news to the country that the federal trade commission has been provided as an adequate means for the scientific adjustment of the tariff. In newspaper parlance, this is the biggest "scoop" that any president ever sprung upon the unsuspecting public. If at any time the tariff was mentioned in any of the prolonged discussion in congress, any committee reports, or any newspaper, in connection with the passing of the federal commission bill, we have entirely overlooked it. So far as we know—and we have tried to watch the progress of the bill pretty closely—there was not the faintest suspicion that the trade commission was intended to consider the tariff in any way. If it was intended to be a tariff commission and a provision was inserted making it possible for the commission to conduct an investigation preparatory to revising the tariff, the provision was put in clandestinely and not only Republicans, but Democrats, with possibly the exception of a small coterie, were deceived. We should like to have the provision pointed out.

If this talk of the President at Indianapolis as to the tariff is not a cheap bluff, he will find great difficulty in carrying out his plan in having the federal trade commission take up the consideration of the tariff. Without giving any thought to the tariff, the new body has a tremendous task. If it devotes proper attention to the important duties with which it is entrusted by the new law, all of the time and thought that the members can possibly command will be needed. It will be absolutely impossible for them to carry on a tariff investigation that would bear the slightest semblance to scientific methods.

What the country needs is a genuine non-partisan tariff commission, whose members, unburdened by other duties, will be entrusted with making a thorough investigation of all matters connected with the tariff and report the facts with proper recommendations to congress.

A Highly Important Decision

THE decision of the United States Supreme Court in the Danbury hatters' case, ruling that the 186 members of the United Hatters of North America who were accused of conspiracy in restraint of trade in boycotting the firm of D. E. Loewe & Co. were liable to triple damages and costs under the Sherman anti-trust law, is one of the most important decisions affecting the relations of capital and labor ever made in this country. Some newspapers have, however, caused considerable doubt in the minds of those not thoroughly informed as to the real significance of the court's decree. Washington dispatches have stated that leading lawyers disagree as to whether the Supreme Court's decision means that workmen will be liable in the future for damages on account of boycotts. It is asserted that some of these eminent gentlemen hold that the Clayton anti-trust law passed last year would make any such prosecution impossible. It is not surprising that this question should be raised, because labor leaders who during the past few years have spent much time and money lobbying at the

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capital at the expense of union workingmen have loudly proclaimed that the Clayton law is labor's new Magna Charta. Hence to admit now that this "Magna Charta" would permit the court to require boycotters to pay for the damages which they inflict upon employers would be to admit that the lobbyists failed.

In a recent number of THE IRON TRADE REVIEW, we called attention to the opinion of Daniel Davenport as to the effect of the labor union injunction and contempt sections of the Clayton anti-trust bill, and elsewhere in this issue we publish the opinions of Walter Drew, counsel of the National Erectors' Association, John Kirby Jr. and D. E. Loewe, all of whom point out clearly that nothing in the Clayton law would prevent another prosecution similar to that which has been conducted by Mr. Loewe. Mr. Drew goes further than the others and shows that under certain conditions the Clayton law confers upon the private citizen a remedy which he did not before possess. Mr. Drew says that had the Clayton act been in effect when the hatters' case was instituted, Mr. Loewe, upon the refusal of the attorney general's department to enjoin the continuation of the boycott against him, could have proceeded in a court of equity himself for immediate injunctive relief without the necessity of waiting the slow proceedings of a suit for damages in order to secure the vindication of his rights.

The unions will not find it possible to show that the Clayton law makes lawful any conduct of a labor union that was unlawful before the Clayton law was passed. As evidence that the labor agitators have arrived at this conclusion, it may be stated that they have already started a campaign for further legislation which will make it possible to conduct a boycott as they please. Doubtless many politicians, as well as labor agitators, will be disappointed in finding the law is not as they hoped it would be, but the leading lawyers of the senate who were instrumental in amending the law into its final form knew exactly what they were doing.

Samuel Gompers, president of the American Federation of Labor, has been quoted as expressing his sympathy "for the men whose homes will be sold to satisfy this terrible award". We see no reason for Gompers shedding crocodile tears. The individuals against whom the costs are assessed in this case were guilty of no more wrongful acts than have been thousands of other union men. It was their misfortune that they got caught. But if Mr. Gompers is willing to do for them as much as he did for the dynamiters, no individual member will be compelled to pay a dollar. When the McNamaras and others were arrested, and for a long time thereafter, Gompers went about the country, howling about how those labor leaders were being outrageously persecuted and he succeeded in raising many thousands of dollars for their defense. He ought to be willing to do as much for the hatters, who certainly are much more reputable than the dynamiters. It is understood that labor unions have already spent many thousands of dollars in defending the boycotters in the Loewe suit. A small assessment on the members of the American Federation of Labor, including the hatters' union, would wipe out the indebtedness due to Mr. Loewe.

The country is to be congratulated on this decision, which surely will have a restraining effect in times of industrial troubles. All workingmen having good motives should rejoice that a decision which promises to bring nearer the time when industrial controversies will be settled in a just and peaceable manner has been rendered by the highest court in the land.

The late Charles S. Price was a fine type of the manufacturer who works his way gradually from a humble position to the highest in a great company. In the olden-time way of speaking, Mr. Price was not self-made, for he enjoyed a college education. But in the real sense, he was self-made. He mastered the details of the drafting room, endured the long hours and discomforts of the steel plant and gradually worked his way to positions of much responsibility. At the same time, he endeared himself to all who toiled with him, so that when declining health made it necessary for him to retire, there was universal sorrow among the workingmen of the Cambria company.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for January, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for Dec., 1914.	Average for Oct., 1914.	Average for Jan., 1914.
Bessemer pig iron, Pittsburgh..	$14.70	$14.70	$14.85	$15.00
Basic pig iron, Pittsburgh.....	13.45	13.45	13.75	13.42
No. 2 Fdy. pig iron, Pittsburgh	13.70	13.70	13.80	13.70
Northern No. 2 Fdy., Chgo....	13.00	13.00	13.25	14.25
Lake Superior Charcoal, Chgo..	15.75	15.75	15.75	15.50
Malleable, Bessemer, Chgo.....	13.00	13.00	13.50	14.25
Southern No. 2, Birmingham...	9.50	9.50	10.00	10.50
Southern Ohio No. 2, Ironton..	12.75	12.75	13.00	13.25
Basic, eastern Pa.....	13.50	13.50	13.50	14.00
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.75
No. 2X Foundry, Philadelphia..	14.25	14.25	14.50	14.75
Ferro mang., Balti.....	68.00	68.00	66.00	36.00
Billets, Pbgh.	20.00	18.50	20.60	20.00
Sheet bars, Pbgh.....	20.50	19.00	21.60	21.00
Steel bars, Chicago.....	1.29	1.19	1.30	1.33
Steel bars, Pittsburgh.....	1.10	1.05	1.17	1.20
Iron bars, Philadelphia.....	1.12	1.12	1.17	1.27
Iron bars, Cleveland, local del'y.	1.15	1.15	1.20	1.30
Iron bars, Chgo. mill.....	.975	.95	1.05	1.13

	Today's prices.	Average for Dec., 1914.	Average for Oct., 1914.	Average for Jan., 1914.
Beams, Chicago	$1.29	$1.19	$1.30	$1.38
Beams, Pittsburgh	1.10	1.05	1.17	1.20
Beams, Philadelphia	1.25	1.20	1.25	1.35
Tank plates, Pittsburgh.....	1.10	1.05	1.14	1.15
Tank plates, Chicago.....	1.29	1.18	1.30	1.33
Tank plates, Philadelphia.....	1.25	1.25	1.25	1.35
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.93	1.86
Sheets, blue an., No. 10, Pbgh.	1.35	1.35	1.40	1.37
Sheets, galv., No. 28, Pbgh....	2.75	2.80	2.93	2.86
Wire nails, Pittsburgh.....	1.50	1.50	1.59	1.59
Connellsville fur. coke contr....	1.70	1.70	1.67	1.85
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.50
Heavy melting steel, Pbgh.....	11.50	10.35	10.75	11.05
Heavy melting steel, east'n Pa.	9.75	9.50	9.75	10.50
Heavy melting steel, Chgo.....	9.00	8.00	9.00	9.19
No. 1 wrought eastern Pa.....	11.50	11.50	11.50	13.25
No. 1 wrought, Chgo.....	8.50	7.70	7.75	8.70
Rerolling rails, Chgo.....	9.50	9.50	10.00	11.00
Car wheels, Chgo.....	10.00	10.00	10.50	11.32

(For Additional Prices See Page 152.)

Eastern Pig Bookings Expand

Statistical Position of Eastern Pennsylvania Furnaces Improves—Moderate Buying at Chicago—Shipments Generally Going Forward Satisfactorily

Philadelphia, Jan. 11.—The statistical position of merchant furnaces in eastern Pennsylvania was improved considerably by December business. In that period, total orders increased 15 to 20 per cent and stocks declined about 7 per cent. These facts were disclosed at the monthly meeting of the Eastern Pig Iron Association. The market in this territory remains in the narrow state that has prevailed since the first of the year. Small sales and only a limited number of these are being made. A Schuylkill valley steel works which took 3,000 tons of first quarter basic as previously reported is in the market for an equal tonnage for second quarter. The Central Iron & Steel Co. has done nothing with its proposition of covering for its first half basic needs. A Reading buyer still negotiates for 1,000 tons of special basic. Some makers are talking $14, delivered, on forward basic, but no sales have been made above $13.50, delivered. Foundry iron is being bought in small quantities. It is unchanged at $14.25 to $14.50, Philadelphia, for northern No. 2X and at $12.50 to $12.75 for Virginia No. 2X. An eastern Pennsylvania soil pipe maker asking 1,000 tons has deferred action. One round sale with an eastern consumer and a number of smaller ones have been closed by makers of low phosphorus metal, in this district. For strictly standard iron, $20, Philadelphia, is the usual basis for lots of size. Other brands are quoted at about $19, Philadelphia, and Lebanon iron at $16 to $17, furnace.

Moderate Sales

Cleveland, Jan. 12.—One agency in Cleveland has sold about 4,000 tons of pig iron during the past 10 days, but very few sales have been made in the immediate Cleveland district. Shipments are, however, going forward as well as can be expected at this time of the year. Furnace operators are looking forward hopefully to a renewal of buying at a not far distant date.

Quiet, But Steady

Pittsburgh, Jan. 12.—The pig iron market in eastern Ohio and western Pennsylvania has been quiet since the middle of December. Steel-making grades show no snap, but prevailing quotations are steady. The Westinghouse Electric & Mfg. Co. and the Westinghouse Machine Co. continue to negotiate for foundry requirements at Allegheny and Trafford, respectively. The Electric company probably will buy for the year; the Machine company is inquiring for first half needs. Despite moderate improvement in the market for finished lines, present blast furnace capacity appears sufficient to meet demands; at least no talk is heard of additional furnaces being blown in.

Demand for Export

New York, Jan. 12.—Opportunities continue before domestic makers to export hematite or bessemer iron analyzing 0.05 in phosphorus and 0.05 in sulphur, to Italy and other European countries, and something may be worked out of these inquiries. No tonnages are fixed in some of the inquiries for Italy which now are receiving attention from sellers in this territory. Recently, as previously reported, Germany also has been seeking this same class of metal. Developments in the iron market in this territory the past week have been few. Sales and inquiries make a light total. A Palmerton, Pa., consumer is out for 1,200 tons for No. 2X for shipment over the year. An Elizabethport, N. J., buyer still negotiates for 2,000 tons of two foundry grades for first half. The Lackawanna railroad has placed 450 tons of foundry for Scranton, Pa. Prices are indef-

(*For complete prices see page* 152.)

inite in this territory, but $14.25 to $14.50, tidewater, for No. 2X well covers the situation. Some low prices still are to be noted in New England where recent sales of No. 2X have been made at $14.25, delivered, for prompt and at $14.50, delivered, for first quarter. These prices are equivalent to $11.80 to $12.05, Buffalo, but the sellers are reported to have been New York state furnaces, with 50 cents freight advantage, over Buffalo furnaces.

Seasonable Slackening

Buffalo, Jan. 12.—Sales for the week have been light and the same is true of the volume of inquiry appearing in the market. While prices generally have held to the recent advances, there has been some slight shading, and it is reported a few sales of No. 2X foundry have been made at $12.75. The price, however, seems to be $13 on this grade of iron and whatever concessions have been made have been confined, for the most part, to the lower silicon irons.

Owing to the fact that a number of the consuming interests of the district are either partly or wholly out of commission at the present time on account of taking inventory and making repairs, the volume of iron going forward under contract has somewhat diminished. Furnace interests, however, consider the slackening to be seasonable and discounted at this time of the year.

Basic iron is being quoted at $13.25 to $13.50 and No. 1 foundry at $13.25.

No Improvement

St. Louis, Jan. 11.—The new year brought no improvement in the pig iron situation in the St. Louis market. There is not an inquiry in the market of any considerable size. Southern No. 2 is freely offered at $9.50, Birmingham basis. Northern iron is quoted at $13 to $13.50, Chicago, and at $13.50, Ironton.

Feeling is Better.

Cincinnati, Jan. 11.—The pig iron market has shown no change during the past three weeks and is still practically void of sales or inquiries. Shipments, however, are going forward in a satisfactory manner, which indicates that a large part of the iron sold late in November and early in December of last year is being used. The present dullness is attributed to the heavy sales during the latter part of the last quarter of 1914, when a large proportion of melters in this territory covered for the first half of this year.

The feeling in the market is much more optimistic, as it is considered by the trade in general that prices are about at rock bottom and that the next move will be an advance. Southern No. 2 foundry iron today is quoted at from $9.50 to $10, Birmingham basis, and southern Ohio No. 2 foundry at $12.75, Ironton basis, both for first half delivery.

Market Remains Quiet

Chicago, Jan. 12.—While a steady inquiry and continued selling mark the pig iron situation in Chicago, it can scarcely be characterized as active. Melters are not enthusiastic about taking on tonnage until they are assured their output will be sufficient to absorb such pig iron as they may contract.

That the tonnage being shipped is increasing is evidenced by the fact that two stacks recently blown out will become active during the present month. The furnace of the Zenith Furnace Co., at Duluth, will be put in blast about Jan. 20, and the second stack of the Inland Steel Co., at Indiana Harbor, Ind., will resume operations about Jan. 15.

Northern foundry and malleable irons are still firm at $13, Chicago, and no assaults on this price are in evidence. The situation remains quiet with a fair volume of inquiry and sales to match. Two stove makers in Michigan are in the market with inquiries for something over 1,000 tons each, which have not yet been closed.

Southern sellers are practically out of this market except for such tonnages as go to melters who need southern grades for their melt. While some sellers are holding firmly at $10, Birmingham, and at least one will make no bid less than $10.50, Birmingham, there is no difficulty in obtaining $9.50, Birmingham, from numerous makers.

The situation in charcoal iron is unchanged, three stacks in Michigan, those at Newberry, Elk Rapids and Boyne City, being still in blast with Manistique and Ashland furnaces inactive.

Tin Plate Mills Busy

Pittsburgh, Jan. 12.—Specifications against contracts for tin plate have been coming at a satisfactory rate this year, and most mills have been able to increase operations to almost normal capacity. The market, although quiet, appears moderately stronger than it was a few weeks ago, although prices are unchanged. The American Can Co. has announced prices for the year as follows: No. 1's, $9 per 1,000, as against $9.25 last year; for No. 2's, $11.75, against $12.25 last year; for No. 3's, $16.50, against $17 last year, and for No. 10's, $42, against $43.50 last year. Other classes are changed correspondingly. Prices are subject to immediate change.

(For complete prices see page 152.)

Coke Output

Decreased Six Million Tons Last Year—Market is Inactive

Pittsburgh, Jan. 12.—Coke operators in the upper and lower Connellsville regions do not expect to witness any great change in the situation until after the market for finished materials shows additional improvement. Active blast furnaces are under cover for the present, and additional stacks probably will not be blown in until demand for finished commodities increases. Coke oven plants are operating at between 40 and 50 per cent capacity, which represents the rate at which they have been running for several months. The bulk of the tonnage for blast furnace consumption for contract delivery was sold at a range from $1.65 to $1.75, ovens, and leading operators now are refusing to sell at less than the maximum figure. Indeed, some owners will not sell at less than $2, ovens, which accounts for many of the idle plants in the regions. Foundry coke is quiet, and shows no change in price. The Connellsville *Courier*, under date of Dec. 31, said production for 1914 was 14,075,638 tons, as compared with 20,097,901 tons the year previous. Production the week ending Jan. 2 was 202,497 tons, a decrease of 5,733 compared with the week before.

No Demand for Coke.

Cincinnati, Jan. 11.—The coke market shows no sign of coming to life and sales and inquiries on both furnace and foundry coke are at a minimum. Almost 95 per cent of melters in this territory are covered until next July, and furnaces have bought sufficient fuel to run them until the end of the second half. As no furnaces are contemplating blowing in, there is no inquiry for furnace coke. Prices on southern coke, which declined almost steadily during 1914, are unchanged from those that have prevailed since Dec. 1.

Still Pending

St. Louis, Jan. 11.—The inquiry for 15,000 tons of foundry coke that has been on the market about a month is still unsold, but local dealers seem confident that it will be closed shortly. This is about the only thing in sight in the coke line. Prices are unchanged.

Wales Asks for Scrap

But High Freights Will Prevent Shipment—Market is Stronger at Pittsburgh and Other Points

Philadelphia, Jan. 11.—Cabled inquiries for heavy melting steel for Wales have been an interesting incident of the old material market in this territory. The extraordinary high freight rates discourage any thought of orders from that source. Due to the demand for heavy melting steel at Pittsburgh at $11.50, delivered, which is drawing in material from neutral points, the eastern market for this grade is sympathetically higher. Consumers in this territory, however, are offering no more than the $9.50, delivered, figure, which has been their price for some weeks without attracting much tonnage. The $11.50 Pittsburgh price is equivalent to $9.10, Philadelphia, or $9.70 to $9.90 at the nearest eastern Pennsylvania consuming points. As a result brokers here now are offering $10, delivered, to clean up unfilled contracts, fearing an advance of the market. The steel on the railroad lists for December went at $9.50 to $9.75, delivered. Consuming demand for most grades of scrap is indifferent. Sales are noted of small lots of shafting at $13.50 and $14, delivered, and of $8.50 for borings at eastern points. For skelp some mills are offering $8.25, delivered. Cast scrap is a trifle weaker.

Scrap Advanced Sharply

Pittsburgh, Jan. 12.—Since the last report covering old materials was offered by THE IRON TRADE REVIEW, rather sharp advances have featured this branch of the market. Improvement, however, appears to be confined to Pittsburgh. Heavy melting steel, quotable at $10.25 a ton a few weeks ago, has sold as high as $11.75 this year, and some dealers are refusing to shade that figure. One of the more important melters has been a prominent factor in the market, taking 20,000 tons of heavy melting steel. Other grades have advanced correspondingly. Dealers express confidence that quotations will continue to reflect gradual improvement.

Scrap is Stronger.

Chicago, Jan. 12.—A further increase in quotations on iron and steel scrap has been made necessary by the continued firmness of dealers, who are holding their accumulations for better things. The total advance from the low market of early winter is now between $1 and $1.50 per ton on almost all grades and sellers apparently have the upper hand.

There is some scarcity of certain grades and railroads have not been offering as large tonnages as usual for the past few weeks. This, together with the decreased production during the slack operation of fall and winter, has given holders of scrap an opportunity to sit back and ask larger prices than were possible through last year.

Railroads apparently have begun to dispose of their scrap accumulations and approximately 12,000 tons are being offered at present. The Chicago & North-Western Railway offers 5,000 tons, of which 500 tons each are No. 1 wrought, No. 1 cast and long rails. The Northern Pacific offers 700 tons, the Kansas City Southern 200 tons, the Southern Railway 2,600 tons, the C., B. & Q. 1,600 tons, the Soo line 600 and the C., St. P., M. & O 1,000 tons.

No Business in Sight

St. Louis, Jan. 11.—Scrap iron prices are unchanged, and there is no prospect for business in sight. No lists were put out by the railroads today.

Market Not Revived.

Cincinnati, Jan. 11.—The scrap market has not revived with the coming of the new year, and is still dull and uninteresting. The curtailment of operations by rolling mills has caused the withholding of shipments, which more than counterbalances the slight increase from jobbing foundries, which latter are fairly busy on machine tool castings. Lists from the railroads are heavy and there is a large surplus in dealers' yards and throughout the rural districts. Prices are again very uncertain due to the lack of transactions, but the general level is reported as unchanged.

Holding Material

Cleveland, Jan. 13.—Scrap producers and yard men are inclined to hold on to material more tenaciously in expectation of an advance in prices. Mills in this district and in the valleys are buying in moderate volume. In view of the low prices prevailing for their products, they are not willing to lay in heavy supplies on the advancing scale of scrap costs in evidence during the past month. While a large quantity of scrap is laid down in yards as an investment, present prices are not sufficiently attractive to yard owners to draw out any great proportion of this material. It is thought prices will advance gradually to a level attractive enough to induce drafts on these supplies, when they will react somewhat. Estimates vary as to what this level will be. Some yardmen claim they are holding out until melting steel reaches $12. Other dealers say $10.50 will induce most holders to unload.

Feeling is Better

Buffalo, Jan. 12.—The feeling among the scrap dealers is better than has been noted in several weeks. A demand for turnings and borings, bundled sheet scrap and heavy melting steel has developed among valley users, but not enough so to cause any changes in prices, which remain the same as previously quoted. The local user of heavy melting steel is out of the market for the time being.

A number of dealers, believing that the better tone will be followed by a better demand and in turn by advancing prices, have been taking over considerable tonnages of scrap to hold against the contemplated improved market.

Brokers Are Active

New York, Jan. 12.—Brokers are the most active factors in the scrap market in this district at the present time. They have been bidding higher or $8, New York, for heavy melting steel. Part of this development is due to their protecting themselves on old orders against a possible general advance, the expectation of which has originated from the higher priced business being done at Pittsburgh, for which the east has been bidding. There also is some evidence of speculation in the brokers' bids. Eastern dealers who have been following up the better market for steel at Pittsburgh now report that the buying there has subsided and that they are unable to get any offers of $11.50 on steel, which previously was done. Cast scrap is less active in this territory, but the market is firm. Borings have continued in fair demand and offers of $8, delivered eastern Pennsylvania, or $6, New York, have been current. In an isolated case, $8.25, delivered eastern Pennsylvania, was paid. Eastern consumers, generally, are buying scrap only on a light scale at the present time.

Frank H. Colladay, eastern district sales manager of the Trumbull Steel Co., has taken larger offices in the Grand Central Terminal building, New York.

(*For complete prices see page* 152.)

Steel Bar Price Firm

Efforts to Shade 1.10c, Pittsburgh, Have Not Been Successful—New Business is Fair

Pittsburgh, Jan. 12.—Plates, shapes and steel bars are firm at 1.10c, for first quarter delivery, and makers are asking 1.15c for second quarter shipment. Both figures have been rather severely tested by important buyers, but no reports of concessions are heard. Buying has not been so heavy since the opening of the new year, as it was the last fortnight in December, but it has been very fair and specifications have been coming out in good volume, enabling mill managers to increase operations to about 50 per cent of capacity. Railroads have been making reservations, and indications are that the market will continue to improve gradually.

Steel Bar Price Holds.

Chicago, Jan. 11.—Sellers of steel bars are holding firmly to 1.29c, Chicago mill, even in the face of comparatively small buying and no shading of this quotation has been heard. Specifications on contracts made during the last quarter at lower figures have provided mills with somewhat better tonnages than have ruled recently and new business at the advance has been comparatively small. However, agricultural implement makers are taking out larger tonnages than had been expected and the steel bar situation is fairly satisfactory.

Placing Some Contracts.

Philadelphia, Jan. 11.—Some contracts for first quarter and beyond still are being put through in this territory, but the number is less than before the first of the year. The Pennsylvania and the Baltimore & Ohio railroads have just placed requirement contracts. The bureau of construction and repairs of the Navy department will take bids Jan. 19 on 1,000 tons or more of miscellaneous bars. The storehouse of the bureau of yards and docks at Washington, which has gone concrete, will require about 400 tons of reinforcing bars. Steel bar prices are firm at 1.25c, Philadelphia, or 1.10c, Pittsburgh, minimum.

Price Maintained

Cleveland, Jan. 12.—Specifications on contracts for shapes, plates and bars are coming in fairly well and while there is very little new business, the 1.10c price, Pittsburgh, is being firmly maintained. Reports emanating from buyers that they can shade that price on bars are sometimes heard, but they have not been verified.

Made Some Gain

Buffalo, Jan. 12.—Mills and agencies of the Buffalo district report that the December orders were in excess of the average for the same month over recent years. Contracts closed with the ending of the year, on bars, shapes and plates, were at 1.10c, base, for the first quarter deliveries, and 1.15c for second quarter. The buying done is believed to have been made on a basis of minimum requirements.

Iron Bars Firmer.

Chicago, Jan. 12.—Considerable firmness is being felt in iron bars and while prices have not responded markedly, there is a well defined tendency to a higher level. While bars are still obtainable at 0.975c and one transaction last week was at 0.95c, bars, for the most part, appear to be selling at 1.00c, Chicago mill, with occasionally a higher figure on less attractive tonnages. Higher prices demanded for scrap bring makers of iron bars to a point where they must obtain more for their product and undoubtedly this has a great deal to do with the feeling of firmness already referred to. Operations of bar mills in this territory are approximately the same as have ruled for several weeks past.

Hoops, Bands, Shafting

Pittsburgh, Jan. 12.—Manufacturers report a moderate increase in specifications for hoops and bands, which are being held at 1.25c and 1.10c, respectively. Cold rolled shafting is responding slowly to the improvement reflected by other lines, but there is no change in the position of prices.

Mines Again Idle

New York, Jan. 12.—Owing to the poor market for iron ore in the east, the mines of the Ponupo Manganese Co. on the south coast of Cuba, which were reopened in September, after an extended idleness, again have been shut down. A tonnage of standard bessemer ore, which this company had sold to eastern Pennsylvania furnaces, has been cancelled. There have been some resale transactions of Cuban low phosphorus ore growing out of the decision of the Chester, Pa., furnace to discontinue the making of low phosphorus iron. Some of the ore originally purchased by this buyer has been diverted to another eastern Pennsylvania furnace.

(*For complete prices see page* 152.)

Ferro Shipments

From England to This Country Are Soon to be Resumed

New York, Jan. 12.—More assurances of the early resumption of shipments of ferro-manganese from England to this country are contained in cable advices just received from their principals by the representatives of the producers in this territory. While no formal action yet has been taken by the English government authorities as to granting licenses of shipment to those consumers in this country who have accepted the set of conditions recently suggested, it is believed the late advices indicate that this action is about to be taken. These conditions, it will be recalled, provided that none of the ferro-manganese to be shipped to consumers here, shall be re-exported to the enemies of Great Britain and contiguous countries nor shall the steel products for the manufacture of which these particular shipments are used, be exported to these destinations. The agents in this country now are asked to forward by the earliest boat all the acceptances they can obtain.

Merchants who have been holding some lots of ferro-manganese in storage in this country have been disposing of some of their material. One merchant sold about 500 tons of this material to consumers within the week. On some of this business $68, seaboard, is said to have been obtained, although it is reported that in some cases a lower figure was made. Except for the occasional inquiry from smaller buyers who are not well covered, there is not much interest in the market at the present time.

Inquiries for 500 to 600 tons of spiegeleisen have been in the market, and the largest parcel, which is for a Canton, O., steelmaker, has been taken by the domestic producer.

Some Ferro Inquiry

Pittsburgh, Jan. 12.—While most consumers of ferro-manganese are under cover for this quarter, dealers report some inquiry has come out, both for the first and second quarters of the year. Because of the limitations placed upon the shipments and consumption of this alloy by Great Britain, buyers show considerable hesitancy about covering future needs. They hope the present complicated situation will clear before additional material is needed. Demand for other alloys is light.

Shading of Sheet Prices

Continues and Some Very Low Quotations Are Made—More Activity at Pittsburgh

Pittsburgh, Jan. 12.—Manufacturers of steel sheets in the Greater Pittsburgh district have been receiving rather heavy specifications since Jan. 1, and mill operations have been slightly increased. Prices, however, have reflected no great improvement, some mills continuing to offer concessions of about $1 a ton in order to take attractive tonnages. Galvanized sheets are being held at 2.80c for No. 28 gage, but that figure has been shaded in numerous instances. Black sheets are comparatively steady at 1.80c and blue annealed sheets at 1.30c for base size gages. Inquiries for material for foreign shipment have come out the last couple of weeks, but no especially large orders have been placed, so far as is known.

Prices Fairly Steady.

Philadelphia, Jan. 11.—Conditions in the eastern sheet market manifest little change. Business is of a miscellaneous character and not of heavy total tonnage. Prices are fairly steady, the usual figure being 1.50c, Philadelphia, or 1.35c, Pittsburgh, for No. 10 gage blue annealed. Eastern mills quoted this figure on some fairly attractive business in the week.

Sheets Better.

Cincinnati, Jan. 11.—Conditions in the local sheet market are brighter, although no changes in prices have taken place. New orders are coming from all parts of this territory, and specifications have been unusually heavy during the past three or four days. In some cases orders received by warehouses indicate that their stocks on certain grades of sheets are very low. Although lower prices are reported in surrounding territories, makers in this district are holding at 3.008c for galvanized sheets No. 28 gage, and 2.008c for black sheets No. 28 gage, both Cincinnati basis.

Sheets Gain No Strength.

Chicago, Jan. 11.—As compared with other finished steel products steel sheets have not gained as much strength. Demand for this product apparently has not become stronger and prices have remained practically stationary. No. 28 gage black is obtainable at 1.99c, Chicago, for immediate delivery with $1.00 per ton higher for contracts through the quarter. No. 28 gage galvanized is obtainable at 2.89c, Chicago mill, for immediate delivery and $1.00 per ton higher for a contract through the quarter, as in the case of black.

The increasing cost of spelter is adding to the cost of producing galvanized sheets and makers believe it will be absolutely necessary to obtain a higher price for this class of sheets within a short time. An advance of $1 or $2 per ton is to be expected almost any day.

Prices Are Weak

Cleveland, Jan. 12.—Business in sheets is moderate and cutting of prices is actively carried on. The surprising feature of the market is the weakness of galvanized sheets, which, on account of the high price of spelter, would presumably be relatively firmer at the present time, but prices as low as any that have been made for recent weeks are still heard of.

Cast Iron Pipe Higher

Continued Buying in Eastern Territory Enables Makers to Make Somewhat Higher Quotations

New York, Jan. 12.—A continued liberal buying of cast iron pipe in eastern territory by both public and private consumers has encouraged makers to ask higher prices. One large producer now is holding 6-inch at $21, New York, which represents $0.50 to $1 over the previous level. All the price irregularities of the market have not been eliminated, however, and it is uncertain whether the advances will become permanent. Reports from all parts of the country show an increased tonnage of lettings with the exception of the south.

Buyers are closing for larger tonnages than a year ago, in some cases fully 50 per cent more. The Standard Cast Iron Pipe & Foundry Co. took the 4,000 tons of 4 to 30's for Boston, at an average price of $19.44, delivered; 480 tons of 8 to 12's for Jersey City, at $19.09, delivered, equivalent to about $18, foundry, and is low bidder on 300 tons for Northampton, Mass., at $21.20, delivered, for 6 and 8's, and $20.70, delivered, for 10 and 12's. The United States Cast Iron Pipe & Foundry Co. has received 2,350 tons of 4 to 12's from the Consolidated Gas Co., of New York, and also 1,550 tons of 4 to 6's for the Public Service Corporation for various New Jersey cities. John Fox & Co. took 166 tons of 12's for New York public work, at $19.87, delivered. Yorktown Heights, N. Y., is opening bids today on 240 tons of 3 to 8's and Albany will take figures on Jan. 18 on 1,068 tons of 6 to 12's. The United Gas Improvement Co., Philadelphia, is in the market for 5,000 tons of 4 to 30's for western and southern cities; the New Haven Gas Co. for 1,000 tons of 4 to 12's; the Counties Gas & Electric Co. for 500 tons of 4 to 12's for eastern Pennsylvania towns, while Bridgeport, Conn., and Holyoke, Mass., buyers are out for 1,500 tons of 12 to 30's and 685 tons of 8 to 16's, respectively. The Providence Gas Co. order, 7,200 tons, probably will go to the largest maker. In export, Honolulu has revived an inquiry for 1,000 tons of 8 to 12's and Manila is figuring on 350 tons of 6's.

City Buying More Pipe.

Chicago, Jan. 12.—Western cities appear to be waking up to their needs for cast iron pipe for water works extensions during the present year and the low prices now obtainable are attractive. A number of lettings are imminent, although none is for an unusually large tonnage. St. Paul will open bids Jan. 18 on 1,200 tons. Kansas City, Mo., has taken bids which were to be opened Jan. 13 for 1,500 tons.

The United States Cast Iron Pipe & Foundry Co. is low bidder at Cincinnati on 1,000 tons of 36-inch pipe, the final award not having been made officially. The same maker has been awarded 250 tons at Ferdinand, Ind.

Warehouse Business Grows

Chicago, Jan. 12.—Warehouse business is settling down to a steadier gait since the holidays are past and demand for all classes of material is excellent. Although the volume of shipments is not equal to other seasons of the year, present conditions are more satisfactory to sellers than has been the case recently and a continued increase is evident which promises a much better situation than existed through the greater part of last year.

(*For complete prices see page* 152.)

Plates for More Ships

Bring Additional Tonnages to Eastern Mills—The 1.10c Pittsburgh Quotation Generally Maintained

Philadelphia, Jan. 11. — Shipyard work remains the principal source of new plate requirements for eastern mills at the present time. Coatesville mills, which have taken perhaps 10,000 tons lately to cover new boat contracts, have entered 2,000 tons additional for a vessel recently placed with the Newport News Shipbuilding & Dry Dock Co. It develops that the last boat taken by this yard a week or so ago is for the Luckenbach Steamship Co., making a total of five vessels this builder has received recently. The Cambria Steel Co. will furnish about 4,000 tons of plates for two vessels recently taken by the Maryland Steel Co. W. R. Grace & Co. are figuring with eastern yards for three good-sized steamships and there are other inquiries pending. Two bridge-work propositions are in the figuring stage, one calling for 7,500 and the other for 5,000 tons of plates. The Pennsylvania railroad is understood to have placed with western mills the 10,000 tons of steel, largely plates, required for 1,000 steel box cars to be built at Altoona. The bureau of construction and repairs of the Navy department will receive bids Jan. 19 on 525 tons of plates for miscellaneous work. Eastern mills have experienced little improvement in their bookings or operations. Specifications still are sluggish. One mill reports having taken 12 or 15 contracts for first quarter the past week at 1.30c, Philadelphia, or 1.15c, Pittsburgh. There is no difficulty in getting early plates at 1.10c, Pittsburgh, but lower figures seem to have disappeared.

Elevated Construction

New York, Jan. 12.—Plate makers are interested in additional tonnages for elevated railroad construction in this city, which are expected to come out in the near future. One of these is the Jamaica avenue elevated line of the New York Municipal Railways Co., in Brooklyn, requiring 7,500 tons of plates. A bridge at Portland, Ore., which is looked for soon, will require about 5,000 tons of plates. Principal activity in the plate market in this territory, however, relates to negotiations for the construction of additional ocean vessels which are being carried on in this city. These number not less than five to six additional boats. Eastern Pennsylvania plate mills have profited most from the boats recently awarded to Atlantic yards and have booked a round tonnage from that source. Plate prices are steady at 1.26c, New York, or 1.10c, Pittsburgh.

Small Plate Demand.

Chicago, Jan. 12.—Owing to the fact that a number of small plate mills in this territory, which roll a partial line, frequently feel it necessary to cut under the existing market to obtain tonnages, the situation as to steel plates is somewhat less strong than in the case of other finished steel products. So far, the established quotation, 1.29c, Chicago, does not seem to have been interfered with, but comparatively small tonnages of plates are being sold and the quotation is largely nominal. A much improved sentiment is evidenced and such orders as do come out are for small tonnages widely scattered, indicating that liquidation has reached an advanced stage and that stocks in the hands of consumers are extremely small, which should result in continuous buying and increased demand as the year grows older.

Billet Prices

Have Been Advanced—Sheet Bars Also Marked Up

Pittsburgh, Jan. 12. — Pittsburgh makers of billets and sheet bars have been able to obtain advanced prices for material for first quarter delivery the last ten days. Sheet bars have sold as high as $21 and billets have commanded as high as $20.50, Pittsburgh. The market at Youngstown, however, continues to show some irregularity; material at that center is quotable at about $1 a ton below figures obtained at Pittsburgh. More important consumers are under cover for the first quarter. Wire rods continue to hover around $25, Pittsburgh.

Eastern Sales Are Small.

Philadelphia, Jan. 11.—Only small sales of billets now are being closed in this district and these show the market for this class of business to be $21.40, Philadelphia, or $19, Pittsburgh, for 4 x 4-inch. One seller closed about 1,000 tons upon this basis. Whether this price would hold firm on larger lots is a matter of doubt at this stage. Eastern billet makers still are operating on a small scale. More or less export inquiry continues to appear, but orders are few.

On one small lot of semi-finished material for the British Isles, a freight rate of 40s from Philadelphia was paid by an exporter in this territory.

Active Contracting

New York, Jan. 12.—Eastern producers have been enjoying a rather active contracting movement in billets with consumers in the metropolitan district, New York State and lower New England territory. Round tonnages were taken in some cases. Considerable of this business represented the usual first-of-the-year covering of regular customers. Prices for billets appear firmer, and $19, Pittsburgh, or $21.60, New York, usually is quoted on 4 x 4-inch rolling billets. An inquiry for 2,000 tons for billets for the British Isles, is current.

Wire Prices

Are Advanced $1 Per Ton—Foreign Demand is Heavy

Pittsburgh, Jan. 12.—Under date of Dec. 11, the American Steel & Wire Co. informed the trade that its lowest price on wire nails is $1.55 a keg and plain wire is being held at $1.35. Independent makers adopted those figures upon learning of the change. Nails had been freely offered at $1.50 a keg for several weeks. The last previous formal change in quotations was last August, when a $1.60 price for nails was announced, but scarcely any tonnage was sold at that figure. In fact, the market, generally speaking, did not advance above $1.55, and the bulk of the tonnage the latter part of 1914 went at $1.50 for nails. Makers are selling only for 60 days' delivery. Demand for material for shipment to belligerent nations continues heavy.

More Contracting Expected

New York, Jan. 12.—Effective Jan. 11, the American Steel & Wire Co. and other leading producers advanced wire products $1 a ton. The new schedule places plain wire at $1.35, Pittsburgh, nails at $1.55, Pittsburgh, painted barb wire at $1.55, Pittsburgh, and galvanized wire at $1.95, Pittsburgh, in carloads to jobbers with the usual 5 cents extra to the retail trade. The advance places the actual market for wire rods at about $25, Pittsburgh. Makers have not been willing to accept, for contracts, the prices recently ruling and have been selling largely for early delivery. The specifications, under these conditions, have been good. It now is believed there will be more contracting at the advanced price.

(*For complete prices see page* 152.)

New Rail Rolling Plan

Proposed by the Pennsylvania Will Delay Placing of Order —Considerable Railroad Business Pending

New York, Jan. 13. (By wire.)—A further conference was held yesterday at Philadelphia between rail makers and Pennsylvania officials over new specifications. Indications now point to an early settlement of the questions at stake and it is believed that at least a portion of the order will be placed before many days.

New York, Jan. 12.—Revised rail specifications have been put forth by the Pennsylvania railroad, to cover its 1915 order, and as these in some particulars are severe, negotiations now under way with the mills may be prolonged.

One of the most important changes introduced into the specifications is the requirement that the rail bloom shall be allowed to cool to the atmospheric temperature before being reheated for the final passes. It is understood few of the mills are in a position without considerable expense to meet this clause and the indications are that a round extra will be asked to cover this item. Several other important changes are incorporated in the new specifications.

Few rail orders have been placed the past week, but a heavy tonnage totaling 250,000 to 300,000 tons is under negotiation, principally for eastern roads. The Boston & Maine now has out an inquiry for 15,000 tons. The New York Central is distributing against its inquiry for 40,000 tons and the New Haven is about to award 20,000 tons. The Portugese railways are asking 20,000 tons of one weight and 7,000 tons of another, in addition to 20 locomotives.

The principal car order of the week was 1,000 hoppers, which went to the Cambria Steel Co., and 1,000 box to the Mount Vernon Car & Mfg. Co., for the Baltimore & Ohio railroad. This road will not buy any additional cars at the present time, though it has 2,000 for the C., H. & D. and some additional for its own needs in prospect. The Long Island railroad has awarded 20 steel coaches to the Standard Steel Car Co., and the Interborough Rapid Transit Co. 12 coaches to the Pressed Steel Car Co.

Some heavy orders for spikes and other track accessories have been placed by eastern roads. The New York Central & Hudson River has awarded 30,000 kegs of spikes, and the Erie 23,000 kegs, a large part of which went to Pittsburgh makers, including the Jones & Laughlin Steel Co. The Lackawanna railroad recently placed 5,800 kegs. Other inquiries include 6,000 kegs for the Nashville, Chattanooga & St. Louis and for the Tennessee Central; 3,500 kegs for the Boston & Albany; 2,000 kegs for the New Haven road traction line; 1,400 kegs for the Boston & Maine, and 1,000 kegs for the New York, Ontario & Western.

The Illinois Central has awarded 25 locomotives to the Lima Locomotive Works.

More Activity at Chicago.

Chicago, Jan. 12.—The Haskell & Barker Car Co. has taken 250 refrigerator cars for Swift & Co. and an equal number for Morris & Co. together with other small orders sufficient to make a total of about 1,000 cars.

The inquiry of the Illinois Central Railway for 1,000 box cars has not yet been satisfied.

Buying of track fastenings on the part of railroads is going on increasingly and inquiry for steel rails is coming out in considerable volume, although nothing of importance has been placed in the west since the first of the year.

Railroads Cover Needs

Pittsburgh, Jan. 12.—Railroads have been covering rail and track equipment needs the last fortnight, taking comparatively heavy tonnages. Leading trunk line roads have been figuring in the market. Demand for spikes for first half delivery has been satisfactory. Standard railroad spikes are quotable at 1.35c, but talk of an advance of $1 a ton is heard. Smaller sizes are being held at about $2 a ton above the price for standard sizes.

Locomotive Building Light.

Depressed buying of equipment by the railroads during 1914, is reflected in the announcement of the Baldwin Locomotive Works, Philadelphia, that in that period, its total output was 800 locomotives, which is the smallest production since 1908, when 617 engines were built. In 1913, the total was 2,025. Of the 800 engines built in 1914, 604 were steam, 190 electric and 6 gasoline. The average number of men employed during the year was 6,759 per week, compared with 15,813 in 1913. In 1912, the payroll at times included as many as 19,300 men. Speaking of export orders, President Alba B. Johnson stated that 20 small locomotives for France ordered Nov. 3 were shipped Nov. 21 and 30 locomotives for Russia were built in 35 days.

(*For complete prices see page* 152.)

Long Pipe Line

Pittsburgh, Jan. 12.—Negotiations have been re-opened in the south to build a pipe line from Cushing, Okla., to Baton Rogue, La., a distance of 584 miles. The undertaking would involve about 50,000 tons of pipe. Orders have been placed for a few miles of 4-inch steel pipe for Canadian shipment. Manufacturers of iron and steel pipe describe discounts as firm, but steel boiler tubes continue to reflect irregularity.

Eight Hours of Moving Pictures

New York, Jan. 12.—An audience composed of Judge E. H. Gary, James A. Farrell, J. P. Morgan, Percival Roberts Jr., and other officers and directors of the United States Steel Corporation, today witnessed the original running off of moving pictures taken at the various properties of the Corporation. These pictures show every operation in the manufacture of steel, beginning with the exploration of ore mines and ending with the manufacture of the finished products, such as wire, structural shapes, tin plate, rails, etc. They also include views illustrating the various methods adopted by the Steel Corporation in practicing its welfare work. They are embodied in 30,000 feet of film, in 25 reels, requiring eight hours to exhibit the entire series. The pictures, work on which was begun in the spring of 1914, were taken for exhibition by the Steel Corporation at the Panama-Pacific exposition in San Francisco.

Nuts, Bolts and Rivets

Pittsburgh, Jan. 12.—Moderate improvement in the market for nuts, bolts and rivets is reported by some makers. Material continues to sell at rather wide ranges in price, making it difficult to represent the market accurately. Specifications have been coming out at a better rate the last two weeks, and several attractive orders have been placed.

The eighth annual convention of the Chicago cement show will be held at the Coliseum, in Chicago, Feb. 10 to 17.

Death of Chas. S. Price

Charles S. Price, one of the most highly esteemed steel manufacturers in the United States, and for two years president of the Cambria Steel Co., Johnstown, Pa., died Jan. 10 at his home in Westmont, near Johnstown. Mr. Price had not been well for several years, but his death was unexpected.

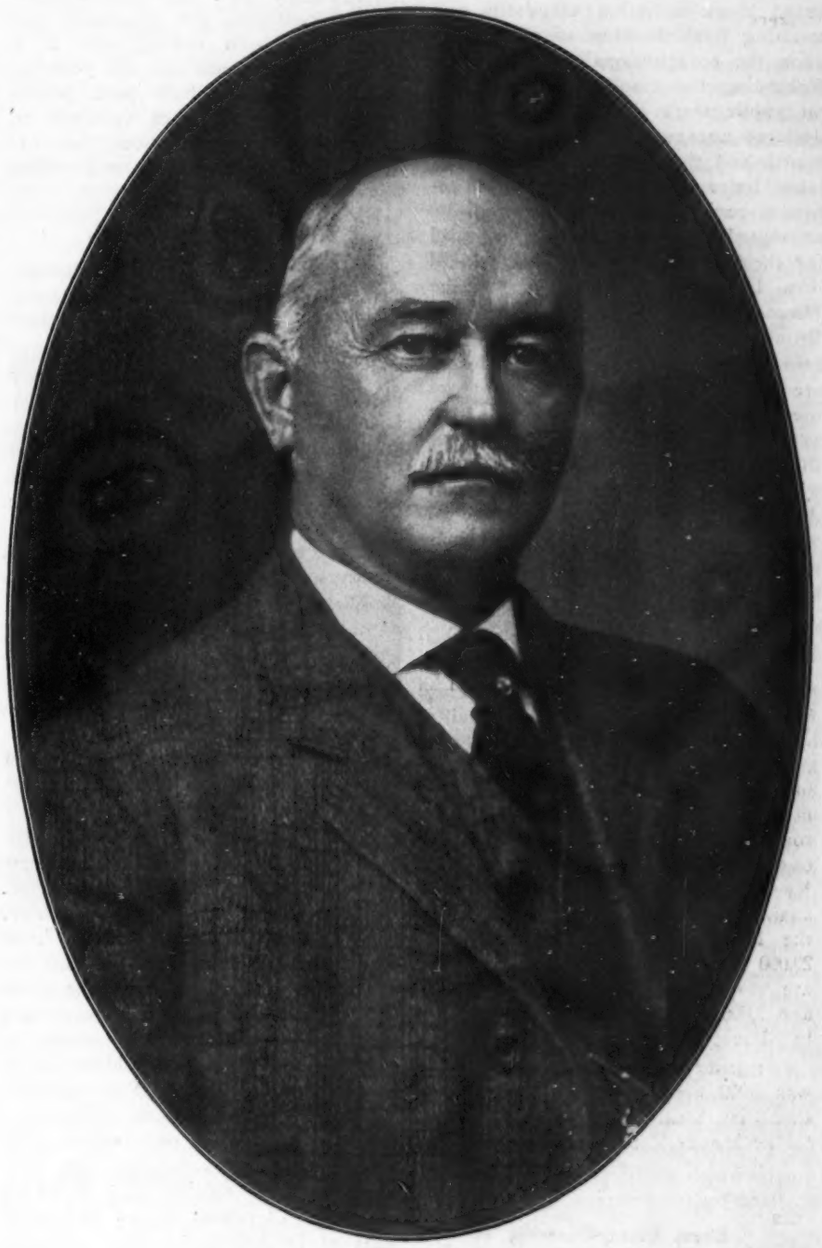
Mr. Price was born at Westchester, Pa., Aug. 27, 1852, and graduated from Cornell University in the class of '72, with the degree of bachelor of civil engineering. His first employment after graduation was with the Detroit Bridge & Iron Works, Detroit, as draftsman, and after short service in that position he was elected city engineer of Lock Haven, Pa., serving three years. In June, 1876, he became a draftsman for the Cambria company, at Johnstown. When the company began the erection of its open-hearth plant, Mr. Price was detailed for duty in connection with that construction work, and upon the completion of the plant was appointed a foreman in the new department. After three years' service as foreman, he was made superintendent of the open-hearth works and filled that position until May, 1884, when he was advanced to the position of superintendent of the bessemer, open-hearth and blooming departments. In January, 1886, the metallurgical department was organized, combining the bessemer and open-hearth steel works, and blast furnaces and rolling mills, and Mr. Price was placed in charge. While holding this position, the great Johnstown flood of 1889 occurred, and Mr. Price stood the test of those trying times. In 1890, he was made general superintendent of manufacture, and in 1892, he became general manager.

Mr. Price was elected president of the Cambria Steel Co., March 7, 1910, succeeding Powell Stackhouse, who retired after a service of over half a century with the company. Mr. Price continued as president until the autumn of 1912, when he resigned on account of ill health and was succeeded by W. H. Donner.

One of the interesting events of Mr. Price's life, a manifestation of the deep affection felt for him by his associates, was a dinner tendered him by the operating heads and members of the sales forces when he became president of the Cambria Steel Co. This event was noted by the absence of formalities and its heartiness. In behalf of his associates in all departments of the organization, Fred Krebs, who was then manager of sales, presented Mr. Price a handsomely engraved silver loving cup.

Herbert Nichols Fenner, president of the New England Butt Co., Providence, R. I., died at his home in that city, Jan. 5, after a short illness, from pneumonia. He was in his 72nd year. He was a native of Providence and after a few years' experience in business succeeded his father, Nicholas Arnold Fenner, in the New England Butt Co. He served as treasurer for many years, and later was made president. He was a director of the Industrial Trust Co. and the Joslin Mfg. Co.

Barton Sewell, president of the Braden Copper Co. and vice president of the American Smelting & Refining Co., died on Jan. 7 at his home in New York. He was one of the best known mining men in the country and prior to the formation of the American Smelting & Refining Co. had been president of the National Smelting & Refining Co. of Chicago and general manager of the United Smelting & Refining Co. of Montana. Mr. Sewell was one of the organizers of the American company. Mr. Sewell also was the first president of the National Lead Co. and was interested in many lead and zinc companies. At the time of his death he was director of the United States Zinc Co. He was in his 68th year.



CHAS. S. PRICE

Few Awards

Of Structural Contracts, But Many Projects Are Pending

New York, Jan. 12.—December proved to be the lightest month in the history of the eastern division of the American Bridge Co. The situation has changed but slightly this month. In this city, subway and elevated work is at a standstill and awaiting final decision of the courts upon the constitutionality of the law forbidding the employment of aliens on public work. This act has been declared unconstitutional by the lower courts and the case probably will be taken before the appellate division before a resumption of activity will be attempted. A large tonnage of steel for these rapid transit extensions still is to be placed, including in part the Jamaica avenue elevated line, in Brooklyn, which will total about 25,000 tons. Some large structural projects are taking form in different parts of the country. One of these is the approaches, 20,000 to 25,000 tons, for the St. Louis free bridge, bids for which are expected to be asked about April 1. There is little evidence of any variation of the 1.26c, New York, or 1.10c, Pittsburgh, price on plain material.

Prospects Are Better.

Philadelphia, Jan. 11.—Prospects for future business seem to be improving for eastern Pennsylvania shape mills, but at the moment, they still are booking very lightly and there has been scarcely any appreciable improvement. In this territory, a little larger tonnage is represented by current negotiations than before Jan. 1; the change, however, is not of a pronounced character. Eastern shape makers now are quoting 1.10c, Pittsburgh, or 1.25c, Philadelphia, minimum. They will not accept contracts on this basis, though they will cover specific jobs, the steel for which is not likely to reach the mills for several months. The Mobile & Ohio railroad is preparing preliminary plans for a bridge across the Ohio river at Cairo, which early estimates place as a 20,000-ton structure.

Sheet Plant Contract

Cleveland, Jan. 12.—There is considerable building in Cleveland, but not of the kind which requires much steel and structural shops are not busy. The McClintic-Marshall Co., which has taken a number of good contracts for this district recently, was again the successful bidder in the active competition for the general contract for the erection of the sheet plant of the Empire Rolling Mill Co., calling for about 600 tons of shapes. The equipment for the six mills will be furnished by the Mesta Machine Co., Pittsburgh. A number of contractors are figuring on the new Jewish hospital, which will require about 500 tons.

Market Quiet

Pittsburgh, Jan. 12.—Specifications against contracts for structural material have been coming out at a moderately increased rate this year, but no large tonnages have been placed this week. Fabricators continue to complain about low prices, but express the belief that they will stiffen this month.

Fair Tonnages Placed.

Chicago, Jan 12. — Preparation for the building season is being reflected in an added demand for structural steel and a number of projects have been contracted within the past few days. Figures are being taken by Lyon & Healy for an office building at Jackson and Wabash, Chicago, and bids have been closed on a building for the W. W. Kimball Co. at the same intersection. Awards on both are expected within a short time. Steel shapes are being held in this market at 1.29c, Chicago mill, and this price appears firm with no tendency on the part of any maker to shade it to obtain a greater share in the business.

Year's Building Permits.

Reports of building permits issued in principal cities throughout the United States show a decrease of 9 per cent in 1914 as compared with 1915. The aggregate of building permits issued in 1913 was $697,594,916, and in 1914 the total was $634,177,323, showing a decrease of $63,417,593. Building operations in 1914 fell off considerably during the last quarter because of the war in Europe, which caused a depression in the financial market and forced the building industry to remain almost at a standstill for more than a month. Cincinnati shows a gain of 6 per cent in 1914 over 1913, permits for the past year aggregating $8,820,749, and $8,318,322 in 1913. Cleveland shows an aggregate of $27,309,010 for 1914 and $23,841,160 for 1913. The total in Chicago during 1914 was $83,261,710 and $89,668,427 during 1913. In Philadelphia the totals were $35,419,605 for 1914 and $38,763,850 for 1913. In New York the aggregate in 1914 was as follows: Manhattan, $56,353,871; Bronx, $21,701,453; Brooklyn, $41,872,307; Borough of Queens, $19,726,154; Richmond, $2,272,758. In 1913 these totals were: Manhattan, $85,403,254; Bronx, $17,676,370; Brooklyn, $34,762,506; Borough of Queens, $18,759,321; Richmond, $3,863,099.

CONTRACTS AWARDED.

Empire Rolling Mill Co., Cleveland; 600 tons for buildings for sheet mills, general contract awarded to the McClintic-Marshall Co.

Additions to the plant of the Keystone Plaster Co., Chester, Pa., 400 tons, awarded an independent fabricator.

Bridge work for Pennsylvania railroad at Camden, N. J., Phoenixville, etc., 750 tons, divided among the McClintic-Marshall Co., the Fort Pitt Bridge Works and the Lackawanna Bridge Co., the first-named receiving the largest part.

Bridge work for Lehigh Valley railroad, 750 tons, awarded, of which 600 tons went to the American Bridge Co. and the balance to an independent.

Bridge at Hilton, N. C., for Atlantic Coast Line and Seaboard Air Line, 550 tons, awarded Virginia Bridge & Iron Works.

Department store, Manchester, N. H., 550 tons, awarded Levering & Gerrigues.

Loft building for Murray Hill Investment Co., Fifth avenue near Thirty-fifth street, New York City, 1,500 tons, awarded independent shop.

Public school No. 18, Brooklyn, 300 tons, awarded Dover Iron Works.

Iola Sanitorium, Rochester, 200 tons, awarded L. F. Hughes & Co.

Buck & Rayner office building, Chicago, 1,500 tons, to American Bridge Co.

Willys-Overland Co., building, Chicago, 1,116 tons, to Hansell-Elcock.

West Texas State Normal School, Canyon City, Texas, 870 tons.

City Hall, Galveston, Tex., 513 tons.

Storehouse for bureau of yards and docks at Washington; concrete construction finally adopted and Geo. S. Wyne, Washington, awarded general contract. Present requirements about 400 tons of reinforcing bars and 150 tons of structural steel.

Rolling mill building for International High Speed Steel Co., Rockaway, N. J., 150 tons, awarded McClintic-Marshall Co.

Basement work for Detroit City Library, 500 tons, general contract awarded Irwin & Leighton. No action taken on superstructure.

CONTRACTS PENDING.

Eastern Grain Milling & Elevator Co., Buffalo, 500 tons reinforcing bars and 500 tons structural, for new 1,000,000 bushel mill and elevator; taking bids this week.

Erie County Jail, Buffalo, being rebuilt, Van Dorn Iron Works, Cleveland, low bidder on steel for cells at $40,627.

Sydenham apartment, Philadelphia, 600 tons; bids being taken.

Normal high school, Washington, D. C., about 900 tons, plans being prepared.

Bridge over Ohio River at Cairo, Ill., for Mobile & Ohio railroad estimated to require 20,000 tons. Preliminary plans being prepared.

Jewish hospital, Cleveland, 500 tons. Bids to be received Jan. 14.

Coal breaker for Lehigh & Wilkes-Barre Coal Co., Wanamie, Pa., 1,500 tons; Ft. Pitt Bridge Works, low bidder.

Bridge work for Delaware, Lackawanna & Western railroad, 400 tons; bids pending.

Arcade building for Standard Oil Co., on lower Broadway, New York, 600 tons; project revived.

The National Builders' Supply Association will hold its annual convention in Chicago, Feb. 8 to 9, with headquarters at the Hotel Sherman.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

George A. Post, president of the Railway Business Association, is being congratulated upon the change of attitude by the interstate commerce commission toward the railroads. Mr. Post was the first president of the association and he is now serving his sixth term in that capacity. The association is recognized as having been a powerful factor in educating the people and their representatives in official life to deal more fairly with the railroads.

Mr. Post was born at Cuba, N. Y., Sept. 1, 1854,, and spent his youth at Owego, Tioga county, N. Y. At the age of 18, he went to Susquehanna, Pa., and entered the freight service of the Erie railroad. Later he became an active Democrat as soon as he was able to vote and at the age of 22 was elected mayor of Susquehanna. When 28, he was elected a member of the forty-eighth congress and had the distinction of being the youngest member of that body. While in the employ of the Erie railroad, he studied law at night and was admitted to the bar of the supreme court of Pennsylvania.

Mr. Post was editor and part owner of the Montrose (Pa.) *Democrat* from 1883 to 1889, and when he moved to New York City in 1889 he took up newspaper work again with the *New York World*, where he remained for two years. In 1892, he entered the railway supply business as vice president of the Standard Coupler Co., of which since 1894 he has been president. Mr. Post was president of the Machinery Club of New York in 1911-12. He is a member of the American Iron and Steel Institute.

W. B. Scott has resigned as foundry foreman of the Rodney Hunt Machine Co., Orange, Mass., to accept a position as foundry superintendent of the Flather Foundry Co., Nashua, N. H.

Frank F. Amsden, a well known furnaceman, has been made furnace manager for Jos. E. Thropp, and is in charge of the Everett stack at Earlston, Pa., which is about to resume operations.

A. R. Sandine, Cleveland, attended the annual sales conference of the Norton Co. and Norton Grinding Co., at Worcester, Mass., Jan. 5-8, and read a paper at one of the sessions on "Correspondence and Clerical Work."

Frank Curtis, formerly with the Best Mfg. Co., Pittsburgh, has taken an interest in the Hubbard Steel Foundry Co., East Chicago, Ind., and has been elected president and general manager. He has assumed his duties and is in charge of the business.

Edwin B. Wilkinson has been appointed general sales agent for E. N. Breitung & Co., Rockefeller building, Cleveland. Mr. Wilkinson was formerly in charge of the blast furnace department of the Pittsburgh Crucible Steel Co., at Midland, Pa.

H. S. Moore now is the direct representative of the Central Iron & Steel Co., Harrisburg, in the Philadelphia district, with offices at 819-20 Stock Exchange building, that city. The Central Iron & Steel Co. formerly was represented in Philadelphia by Chas. K. Barnes & Co.

GEORGE A. POST

R. M. Nicholson, formerly advertising manager of the Kimberly-Clark Paper Co., Neenah, Wis., and who also was employed as space buyer for the Cramer-Krasselt Co., Milwaukee, has been appointed advertising manager for the Berger Mfg. Co., Canton, O.

Franklin Hendrickson, general manager of the Fisher & Norris Eagle Anvil Co., Trenton, N. J., has announced that he will retire shortly after serving the company for nearly 30 years. He began work there as a laborer. This long record is one of efficiency and devotion to his employers. Mr. Hendricksen will leave in the early spring for an extended trip through the west and Alaska and return by the way of the Panama canal. He will be absent six months.

Burton L. Berner has resigned as department manager for the United States Metals & Mfg. Co., in Chicago, and has become sales manager for the Highland Iron & Steel Co., with offices at West Pullman, Ill. This company operates iron bar mills at Chicago and Terre Haute, Ind.

Hubert Merryweather, formerly with the Juragua Iron Mines Co., of Cuba, owned by the Bethlehem Steel Corporation, now is vice president and general manager of the Bethlehem-Chile Iron Mines Co., operating the Tofo iron mines near Coquimbo, Chile, which also are controlled by the Bethlehem company.

A. E. Borie has resigned as chairman of the board of directors of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., in order to devote his time to the American Road Machinery Co. and the Good Roads Machinery Co., of which companies he is chairman of the board of directors, and other interests. Mr. Borie remains a director of the Taylor-Wharton Iron & Steel Co.

John J. Morse, one of the best known iron men in St. Louis, has forsaken the trade and become a lawyer. Mr. Morse was admitted to the bar in St. Louis, Jan. 11. He was connected with the St. Louis Car Wheel Co. for 20 years, and for five years was general manager. When the concern was taken over by the Southern Wheel Co., two years ago, he became secretary-treasurer of that company, holding the position 18 months, when he resigned.

D. S. Guthrie has been appointed district sales agent of the Republic Iron & Steel Co., at Chicago, vice Ralph P. Zint, resigned. Mr. Guthrie has been in charge of the Cleveland district sales office for several years, having been previously the company's representative at Birmingham, Ala., and St. Louis. Mr. Guthrie will be succeeded at Cleveland by W. B. Topping, who has been in charge of the company's sales office at Philadelphia. Mr. Topping will be succeeded at Philadelphia by W. H. Oliver, who has been his assistant. Mr. Zint has made no announcement as to his plans for the future.

Money and Iron: Fact, Comment

Reserve Board Member Harding Talks Hopefully

Former Birmingham Member Thinks Iron and Steel Business is Working Out of Its Troubles—Prospect of Large Profits Encourages Shipbuilding in the East

Washington, Jan. 12.—"We certainly have passed through the acute stage of financial trouble in this country and are getting to a point where, no matter how long the European war may continue, we can adapt ourselves to it," said William P. G. Harding, a member of the federal reserve board to THE IRON TRADE REVIEW correspondent. "The first step of progress from panic to prosperity is an easy money market. We have made that step, because there is extreme ease in the money market. Prosperity will come later on—just how soon I cannot say, of course, but it will come nevertheless."

Mr. Harding comes from Birmingham, Ala., where he was a former banker and head of the local chamber of commerce, and therefore has been a student of the iron and steel and cotton markets. They are improving, he said, along with other markets of the country, and will continue to be stimulated. Merely as an indication of better times for iron and steel and cotton interests in the south, Mr. Harding pointed out that the Louisville & Nashville has placed an order for 28,000 tons of rails with the Tennessee Coal, Iron & Railroad Co., and that the price of cotton recently has been advanced $5 a bale.

It is Mr. Harding's opinion that the iron and steel business is proceeding cautiously and, citing conditions in finance, gave examples to show where it will benefit from contracts for tonnages.

"People having money," he said, "will want to do something with it. Individuals having properties to improve can now secure labor and material cheap, and the present ease of money augurs more industrial activity. Growing cities are extending their systems, such as waterworks and this will be good for the pig iron market, for, of course, pipe will be necessary. Such extensions are usually met by bond issues and the money market is now opportune for those issues because of the cheapness of rates, and, moreover, municipal bonds are not subject to the income tax law."

Reference was made to the fact that discount rates in the Atlanta and St. Louis federal reserve districts have been reduced, both districts having the same rates. Thirty-day paper has a rate of 4½ per cent, 60-day paper, 5 per cent, and 90-day paper 5½ per cent.

Even then, Mr. Harding said, there has not been much business with the reserve banks, because money can be borrowed upon terms equally as inviting from Chicago and other centers.

"But it shows," added Mr. Harding, "the value of the federal reserve system as a stabilizer. It acts as a governor in holding down the rates."

Good Prospect of Profits

Two influences have operated strongly to bring about the rejuvenation of ship building activity along the Atlantic coast which has been manifested by the number of contracts for new ocean-going vessels placed since Dec. 1. In that period no less than eight boats have been ordered with a gross tonnage of about 55,000 and five or six others now are under negotiation. Of the boats placed, two are for the Standard Oil Co. and one each are for the A. H. Bull Steamship Co., the New York & Porto Rican Steamship Co., the Anglo-Saxon Petroleum Co., a British company, the Crowell & Thurlow Co. and the Munson Line. The purchaser of the other boat is unknown. The Newport News Ship Building & Dry Dock Co. has taken five of these boats, the Maryland Steel Co. two and the Harlan & Hollingsworth Corporation one.

One of the factors that has brought about this increased interest in ship investments has been the opening of the Panama canal. Freight tonnage which has fallen to the new lines recently established through that waterway apparently has been very heavy. Shippers now are obliged to take their turn to get freight room on vessels plying between the Atlantic and Pacific coasts through the canal. Perhaps this condition was illustrated by the advance of $1 a ton to 30 cents per 100 pounds between New York and Pacific coast ports which recently was put into effect on steel products by the steamship companies. The American-Hawaiian Steamship Co., which has a large fleet operating between the coasts, has its freight accommodations filled for a long time ahead and has been refusing tonnage. This steamship company not long since put into service eight new vessels of good tonnage which were built by eastern yards especially for the Panama canal traffic.

The other condition which has brought to a head propositions for increasing vessel tonnage, is the very attractive basis for the carriers upon which freights have been established by the shortage of bottoms growing out of the European war. Freights are now on a phenomenally high plane. Quotations now being made for the transportation of iron and steel products between Atlantic coast and British ports rule from 35s to 40s per ton or practically prohibitive figures. A rate of 42s from Philadelphia to Sheffield, Eng., recently was named on a lot of muck bar, but this included some inland haul on the other side.

Growing out of this high and active freight situation has come the making of a number of time charters at alluring terms for vessels which previously had been eking out a business existence at small or no profits. As an instance, one vessel costing approximately $300,000 originally, has been chartered at $11,000 monthly to run through the Panama canal. The company chartering is to pay all operating cost, insurance, etc. In fact, nothing but the interest upon the investment and the depreciation falls to the ship owner. This means a net return of not less than 20 per cent on the investment, an especially tidy recompense in view of the way ship-operating ventures have been running in recent years for American capital.

Confined to Chicago

The criticism recently aroused in regard to the federal reserve system has been confined very largely to Chicago. It was charged that two national bank directors dominated the Chicago regional banks' board, giving friends positions, keeping interest rates above the open market

figures, thus keeping re-discount operations in the hands of banks other than the regional institutions. J. B. Forgan and Geo. M. Reynolds, who are directors and own 25 per cent of the stock of the Chicago Reserve Bank, admit the domination so far as their long experience leads other directors to follow their directions, but they deny dictating the conduct of the institution and filling positions with their followers. The re-discount policy is fixed by the federal reserve board in Washington, which has openly stated that it does not intend to cut rates so as to compete with member banks, at least not in the immediate future. The board is using its influence to prevent inflations and in so doing is receiving general commendation.

Stocks Advance

Numerous industrial stocks made gains on the New York stock exchange last week, including the following: American Can, 4½; American Locomotive, 3½; Bethlehem Steel, 5; Bethlehem Steel preferred, 6; General Electric Co., 4; International Harvester of New Jersey, 6¾; National Enameling & Stamping, ⅝; Pullman Palace Car, 3; Railway Steel Spring, ¾; Republic Iron & Steel, 1¼; Sloss-Sheffield Steel & Iron, 2; United States Steel, 1¾; United States Steel preferred, 2⅛, and Westinghouse Mfg., 3⅜.

Financial Notes

Indifferent buying by the railroads left its effect upon the earnings of the American Brake Shoe & Foundry Co. for the fiscal year ended Sept. 30. In that period the net was $1,023,572 and the surplus $301,572, the latter a decline of $303,515. Dividends of 8 per cent on the preferred and of 7 per cent on the common stocks were paid, the charge amounting to $722,000.

At the annual meeting of the Pennsylvania Railroad Co., to be held March 9, the stockholders will be asked to authorize an increase of $100,000,000 in the indebtedness of the company. The new bonds will be used to provide funds for the refunding of bonds, car trusts and other obligations maturing this year.

The Harbison-Walker Refractories Co., Pittsburgh, has declared a dividend of 1½ per cent on the preferred stock.

A petition in bankruptcy has been filed against the McNutt Can Co., Inc., of New York.

The La Crosse Plow Co., La Crosse, Wis., has increased its capital stock from $600,000 to $900,000, the additional issue of $300,000 to be used in obtaining funds for the use of the business. No extensions or important improvements are planned.

The American Rolling Mill Co., Middletown, O., has declared quarterly dividends of 2 per cent on the common stock and 1¾ per cent on the preferred.

Stockholders of the Speedwell Motor Car Co., Dayton, O., have appointed a committee to obtain additional capital. At a recent meeting of the stockholders it was stated that the company had been compelled to refuse an order aggregating about $900,000 for shipment to Europe, on which it could have made a profit of about $200,000 if it had had the necessary manufacturing facilities.

FEDERAL RESERVE BOARD IN CONFERENCE

The Federal Reserve Board, taken during a conference. This is the first time such a picture has been made, the only other picture of these men together, having been made when the board was first appointed.

Left to right around the table are: Secretary of the Treasury W. G. McAdoo, Comptroller of the Currency John Skelton Williams, Adolph C. Miller, Frederic A. Delano, Dr. H. Parker Willis (secretary), W. P. G. Harding, Paul Warburg, and Charles S. Hamlin (governor).

Implement Association Meeting

The Mississippi Valley Implement and Vehicle Association will hold its annual convention in the St. Louis Coliseum, Jan. 20, 21 and 22. One of the features of the convention will be the Hardware, Implement and Vehicle exposition to be held under the auspices of the Missouri Retail Hardware Dealers' Association.

It is expected that more than 300 implement and vehicle men from Missouri, Kentucky, Arkansas, Tennessee, Mississippi and Louisiana will attend. The St. Louis Implement and Vehicle Association will be host to the visitors.

Only a Favored Few

Knew That the Federal Trade Commission Would Also Be a Tariff Board—Secret Not Revealed in Congress

Washington, Jan. 12.—Talking to newspaper correspondents this morning, President Wilson commented on that part of his Indianapolis speech relating to the powers of the federal trade commission, and said it will have the board functions of a tariff board, as well as the authority to regulate corporations.

It was pointed out by the President that the commission not only will take over the authority of the bureau of corporations, but will be empowered to investigate foreign trade conditions and to obtain information from the bureau of foreign and domestic commerce, department of commerce, in the way of reports, such as foreign opportunities, and suggestions for the promotion of export trade.

The provision empowering the trade commission to act as a tariff board is contained in paragraph h of section 6, which says the commission shall also have power—

"To investigate, from time to time, trade conditions in and with foreign countries where associations, combinations or practices of manufacturers, merchants or traders or other conditions may affect the foreign trade of the United States, and to report to congress thereon, with such recommendations as it deems advisable."

It was only the immediate leaders of the majority party who were aware that such a power had been given the commission and he seemed to take delight in saying that the Republicans apparently had not noticed it. There was not a word in discussion of the commission bill in congress and apparently not in the newspapers as to its authority to act as a tariff board.

Buffalo Banquet

Noted iron and steel men as well as railroad presidents and managers were guests of the Buffalo chamber of commerce the evening of Jan. 7, at the annual dinner held at the Ellicott Club. At the speakers' table were President James A. Farrell, of the United States Steel Corporation; President E. A. S. Clarke, of the Lackawanna Steel Co.; President F. D. Underwood, of the Erie railroad; W. H. Truesdale, president of the Lackawanna railroad; W. H. Canniff, president of the Nickel Plate railroad; John A. Penton, president of the Penton Publishing Co.; United States Senator James W. Wadsworth Jr., and others.

The post of toastmaster ably was filled by Frank B. Baird, president of the Buffalo Union Furnace Co. Mr. Clarke spoke on "Buffalo and the Buffalo Chamber of Commerce"; Mr. Post, on "Business and Legislation"; Congressman W. D. B. Ainey, of the fourteenth district of Pennsylvania, on "Our Relations with Japan and the Far East"; Senator Wadsworth, on "Western New York in National Affairs", and Mr. Farrell, on "Work and Aims of the National Foreign Trade Council".

Will Control

Zug Brands, But Ryersons Have Not Purchased Zug Plant

From a misleading caption written over an item published in THE IRON TRADE REVIEW of Jan. 7, our readers were led to believe that Joseph T. Ryerson & Son, of Chicago, had bought the properties of the Zug Iron & Steel Co., of Pittsburgh. Such is not the case. Joseph T. Ryerson & Son have merely entered into an agreement whereby they have secured the exclusive control of the Zug brands and formulas. As stated plainly in the body of the original item, Joseph T. Ryerson & Son have taken over the supervision of the manufacture and sale of the Zug brands of wrought iron and have added them to the other high grades of wrought iron which Ryerson & Son have been selling for years. The handling of the Zug brands by Joseph T. Ryerson & Son has nothing to do with the identity of the Zug company or with its physical properties, such as the Pittsburgh mill plant.

Submarines

Including Biggest in World Awarded by Navy Department

Washington, Jan. 13. (By wire.)—The navy department yesterday awarded contracts to the Electric Boat Co. for one sea-going submarine, to be built at Quincy, Mass., at $1,350,000, and for three coast defense submarines to be built at Seattle, Wash., at $450,000 each. The Lake Torpedo Boat Co. was given contracts for four coast defense submarines, to be built at Bridgeport, Conn., at $427,000 each. The sea-going submarine is to have 1,000 tons displacement and is twice as large as any submarine in any foreign navy. Coast defense submarines to have approximately 350 tons displacement.

Improvement

Is Being Made Slowly in Mill Operations —Rail Order

New York, Jan. 13. (By wire.)—Bookings with large companies continue to hold up at the increased December level. Operations gradually are improving. The United States Steel Corporation is running better this week than last and active capacity will be further increased next week, but at present it is still under 50 per cent. Sheet business is better and more capacity is going on.

The Nashville, Chattanooga & St. Louis placed 5,000 tons of rails with the Tennessee company.

METAL MARKETS

New York

Jan. 12.

The spelter market has been characterized by some interesting developments recently. On a good demand from abroad, and from the domestic brass industry, prices have advanced steadily, until prime western now cannot be obtained at less than 5.90c to 5.95c, St. Louis, or 6.05c to 6.10c, New York. Some producers are asking as high as 6.20c, New York. A feature of the market is the record premium obtained on brass special grade. Brass special practically is sold out as a result of the big demand from Europe for this grade. The price now is 7c, New York, compared with the usual premium of .25c per pound over prime western. The only poor spot in the spelter market is the lack of demand from galvanizers.

Although demand for copper does not appear to be very active, prices asked by first hands are higher. Electrolytic now is quoted by these interests at 13.62½c to 13.75c, delivered 30 days, and casting copper at 13.45c to 13.60c, usual terms. In the outside market, however, considerable quantities are available at 13.50c to 13.62½c, delivered 30 days for electrolytic, and 13.37½c to 13.40c, delivered 30 days, for casting. Similarly, while 13.75c, cash New York, is asked by producers on good brands of lake, the metal can be obtained from some sellers at 13.50c, cash.

Tin has fluctuated up and down during the week. While there were a few good days, the amount of business transacted has not been large in the aggregate. Today, following a decline in London, the market here is weak. Spot is available at 33.50c. Shipment from London is quoted at 33.25c, and from the Straits at 32.25c. There is very little interest today either in spot or futures.

Thomas R. Heyward Jr., who has been associated with Walter-Wallingford & Co., at Pittsburgh, for several years, has severed this connection and has opened an office in the Farmers' Bank building, Pittsburgh, as a dealer in iron and steel products and alloys.

How Special Shapes Are Rolled

A Description of the Methods and Equipment Employed in Rolling Steel Sections for Tools, Typewriters, Cutlery and Many Other Purposes

BY E C KREUTZBERG

THE ingenuity of steel works engineers in designing and constructing rolls for the production of material to meet special requirements, has been an important factor in promoting the demand for very small and irregular sections. As a result, a great many shapes which formerly were produced in stamping, forging and machine shops, now are turned out in the rolling mill. Here the same results are obtained, as far as regards accuracy and quality, while in the matter of costs, the rolling mill, being always a bulk, rather than a unit producer, distinctly has the advantage. To such a degree has the demand for light weight special sections grown that in some cases rolling mills have found it advantageous to devote their entire capacity to this class of production. These mills have assumed to the rolling mill industry somewhat the same relation a jobbing foundry has to the foundry trade; they serve their customers in the capacity of consulting engineer, and aid in discovering and developing new uses for rolled steel. As a result, they play an increasingly important part in enlarging the outlet for finished steel.

A rolling mill typical of this class is that of the Philadelphia Steel & Forge Co., Tacony, Pa. This company operates two mills, a 12-inch, having three stands, and a 10-inch, having seven stands, thus admitting of considerable flexibility in the rolling operations. These have capacity for rolling any section which comes within their range of dimensions: Squares from 7/32 inch up to 3½ inches; rounds from 7/32 inch up to 3⅛ inches in diameter, and flats up to 1½ x 4 inches. At the present time, the company rolls about 250 different sections, which include such products as typewriter shapes, pawl steel, baby carriage tire rim stock, lock-nut steel, tool steel sections, file and rasp steel, axe and hatchet sections, skate sections, lawn mower knife steel, cutlery steel, small sled runner steel and all forms of bevel and taper steel. The lightest product rolled is a small keystone section, which weighs 0.140 pound per lineal foot; the heaviest section weighs 42 pounds per foot. In Fig. 1 are shown a number of small sections, representative of those rolled by this company.

In the production of these small sections, naturally, the factor of prime importance is accuracy in the construction of the rolls. Unusual care and skill are required in designing the rolls, making the templates, making the tools for turning the rolls, and in turning the rolls themselves. The company does all this work in its own roll shop, which is equipped with one 12-inch double and one 12-inch single roll lathe, each motor-driven. Frequently, as in the usual rolling mill practice, the rolls for new shapes are not found to be in satisfactory condition until they have been adjusted

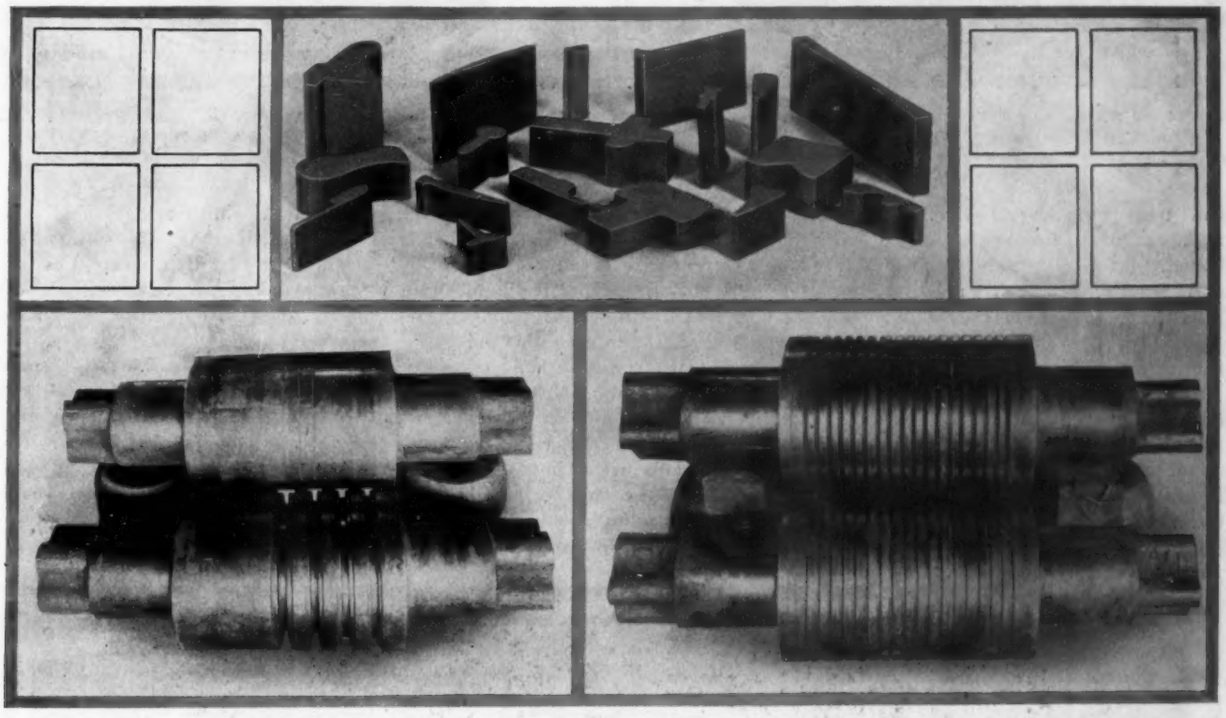


FIG. 1—TYPICAL SMALL, IRREGULAR SHAPED STEEL SECTIONS HOT-ROLLED IN 10-INCH MILL BY PHILADELPHIA STEEL & FORGE CO.

FIG. 2—TOP AND BOTTOM ROLLS WHICH ARE DESIGNED FOR PRODUCING FOUR DIFFERENT SIZES OF T-BAR SECTION

FIG. 3—ROLLS FOR TWO SIZES OF A SMALL KEYSTONE SHAPE. BECAUSE OF RAPIDITY WITH WHICH ROLLS WEAR, NINE DUPLICATE PASSES ARE PROVIDED FOR EACH SIZE

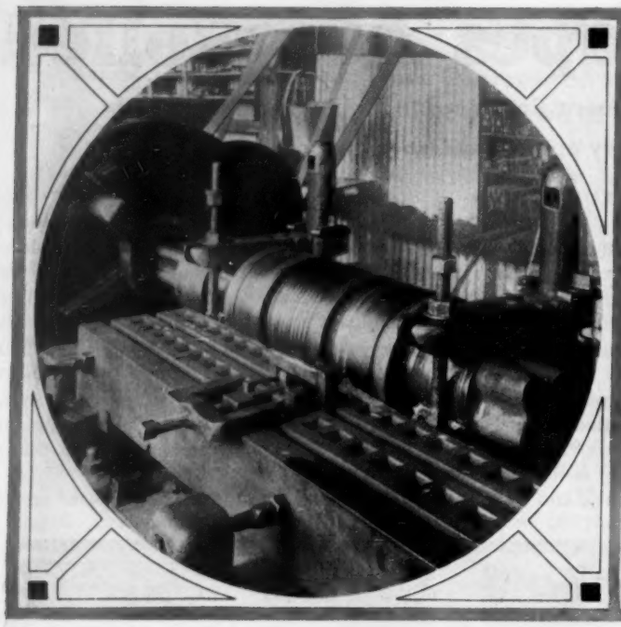


FIG. 4—TURNING UP A TOP ROLL FOR ROLLING 7/32-INCH FLUTED SQUARES. THIS SECTION WEIGHS 0.150 POUND PER LINEAL FOOT

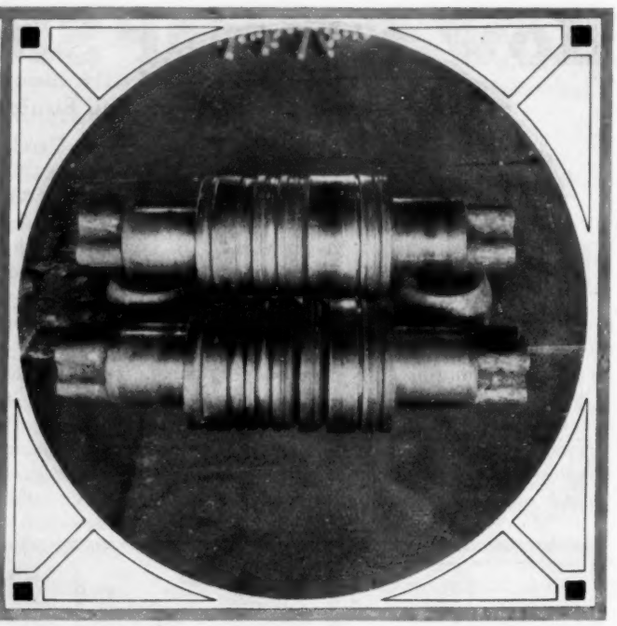


FIG. 5—ROLLS FOR ROLLING TWO SHAPES OF PAWL STEEL AND TWO TYPEWRITER SHAPES.

and tried out several times in the mill, and, to a somewhat more extended degree than in the ordinary mill practice, the rolls must be adjusted frequently in operation, and, occasionally taken back to the roll shop for returning.

Typical 10-inch rolls required for the production of small and irregular shaped sections, are shown in the accompanying illustrations. Fig. 4 shows a top roll being turned up in the lathe for rolling a 7/32-inch fluted square; this section weighs 0.150 pound per foot. Fig. 2 shows the top and bottom rolls for producing four different sizes of T-bar sections; these sections, respectively, weigh 0.776, 0.944, 1.10 and 1.42 pounds per foot. Fig. 3 shows the top and bottom rolls for producing two sizes of "Keystone" sections; these weigh respectively 0.161 and 0.220 pound per foot. Because of the rapidity with which the rolls wear in rolling this small section, the rolls originally are provided with nine grooves for each size of the two keystone shapes, as shown in the illustration; thus, it is unnecessary to return the rolls to the roll shop until all the grooves are worn out. In Fig. 5 are shown the top and bottom rolls for producing two sizes of pawl steel shapes, and two typewriter shapes. The pawl steel shapes, rolled on the left side of the roll, each weigh 1.25 pounds per foot. The heavier of the two typewriter shapes weighs 3.25 pounds per foot. The other typewriter shape, the groove for which is shown at the extreme right of the rolls, is in the

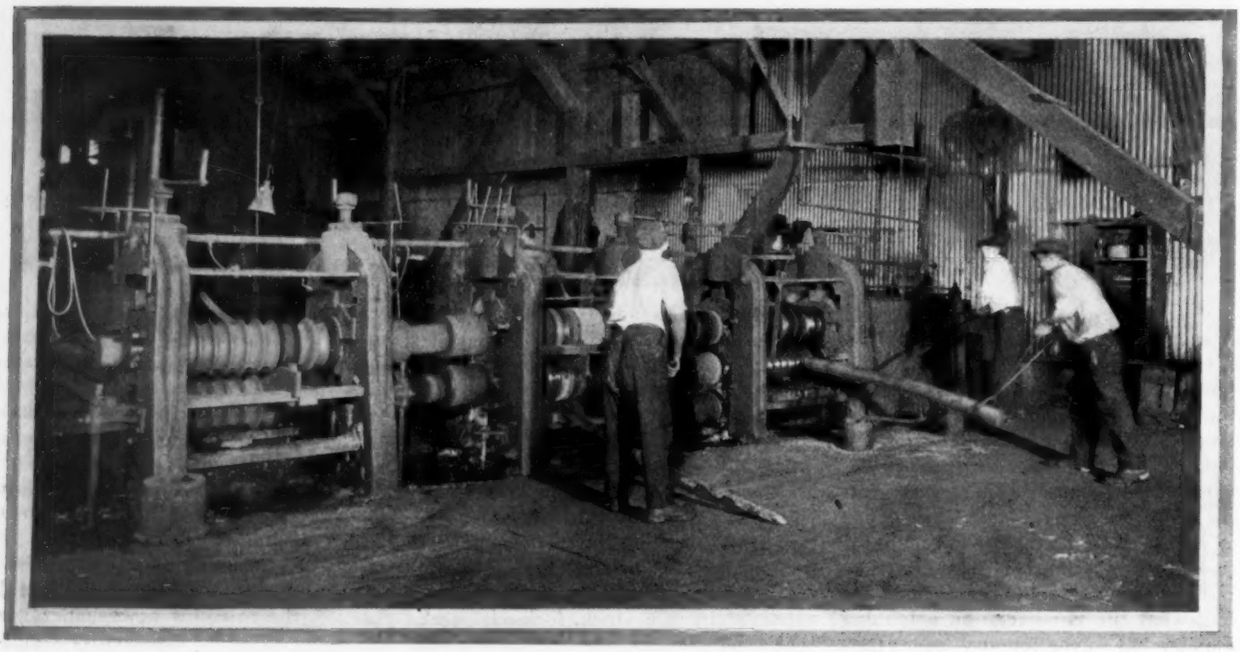


FIG. 6—FRONT VIEW OF 12-INCH MILL, THREE STANDS

form of a cross and weighs 2.64 pounds per foot. The skill required in rolling these small sections is reflected by the fact that the flanges of this cross shape are 3/16 inch and 5/16 inch thick, respectively. The company, in fact, rolls down to 0.042 inch thick.

In general arrangement and equipment, the rolling mill is designed especially for the production of these small sections. The building is 60 x 245 feet and is equipped with an overhead tramrail system for transporting billets to and from the heating furnaces. The latter are five in number; they are of the coal-burning type and are provided with water-cooled fronts. The 12-inch mill has a cooling bed 30 feet long, while that of the 10-inch mill is 150 feet long. This department also is equipped with a shear, hot saw and a wire rod coiling machine. The company shortly will augment this equipment by installing a five-ton electric traveling crane, which will command the heating furnaces, rolling mills and cooling beds. A bundling room, for cutting, bundling and weighing the steel after it has been rolled, immediately adjoins the rolling mill department.

In addition to the rolling of light weight special sections, the Philadelphia Steel & Forge Co. makes a specialty of producing high grade gun, engine, locomotive, automobile and miscellaneous shapes and forgings. Particular attention has been devoted to the forging of piston rods for locomotives of the modern type, the company now furnishing the rods for 19 railroads. The steel for this high grade work consists usually of alloys which have been developed after years of experiment; they are made specially for the company under its supervision. These alloys include principally chrome - nickel, chrome-vanadium and nickel steels; in addition, the company employs all grades of crucible and open-hearth steel. On being delivered to the plant, samples are taken for analysis, while all billets and blooms are pickled to reveal seams and surface faults, which might lead to defects in the forgings or rolled shapes. Such faults are removed by means of pneumatic chippers.

In the production of high grade shapes and forgings, the company, next to the use of good steel and the exercise of care and skill in each stage of the manufacture, considers proper heat treatment of prime importance. For this purpose, it has developed a heat treating plant through which are passed all the forgings and bars. This department, which is housed in a building 30 x 64 feet, contains two 12 x 18-foot heating furnaces of the buggy type. Each furnace is equipped with four pyrometers for the measurement of temperature, two additional pyrometers being located in the laboratory in order that the heat changes may be noted by the metallurgist. Each furnace also is provided with a recording thermometer. The particular feature is that the temperature within these furnaces can be controlled within limits of 10 degrees, this, it is claimed, being due to the construction of the fire boxes which, instead of being built as a unit, are located at the front and back of the furnace, while the flue is at the extreme front. All changes in the draft are effected by the operator, rather than by the use of a thermostat, as is customary in some plants. These furnaces are fired with coal, the use of natural or forced draft depending on requirements. In addition, the heat treating department contains a small furnace, 6 x 6 feet, which is used for small work and for experimenting.

An important factor in the successful operation of the heat treatment plant, is the fact that the temperature of the oil bath, by means of a unique cooling system, can be maintained within a range of 20 degrees. The oil is cooled by means of water, which flows through coils in the tank; in addition, the tank, to a depth of about three feet, practically is immersed in running water. The cooling of the water bath involves a less complicated arrangement, cold water being fed into the tank under pressure through a 2-inch inlet, and being discharged through a 5-inch outlet; in this manner, a constant flow is maintained. The oil tank is 8 x 20 feet and 8 feet deep, while the water tank is 6 x 16 feet and 6 feet deep.

Three hammers compose the major equipment in the forging department, which is 60 x 120 feet. One of these has a capacity of three tons, the sec-

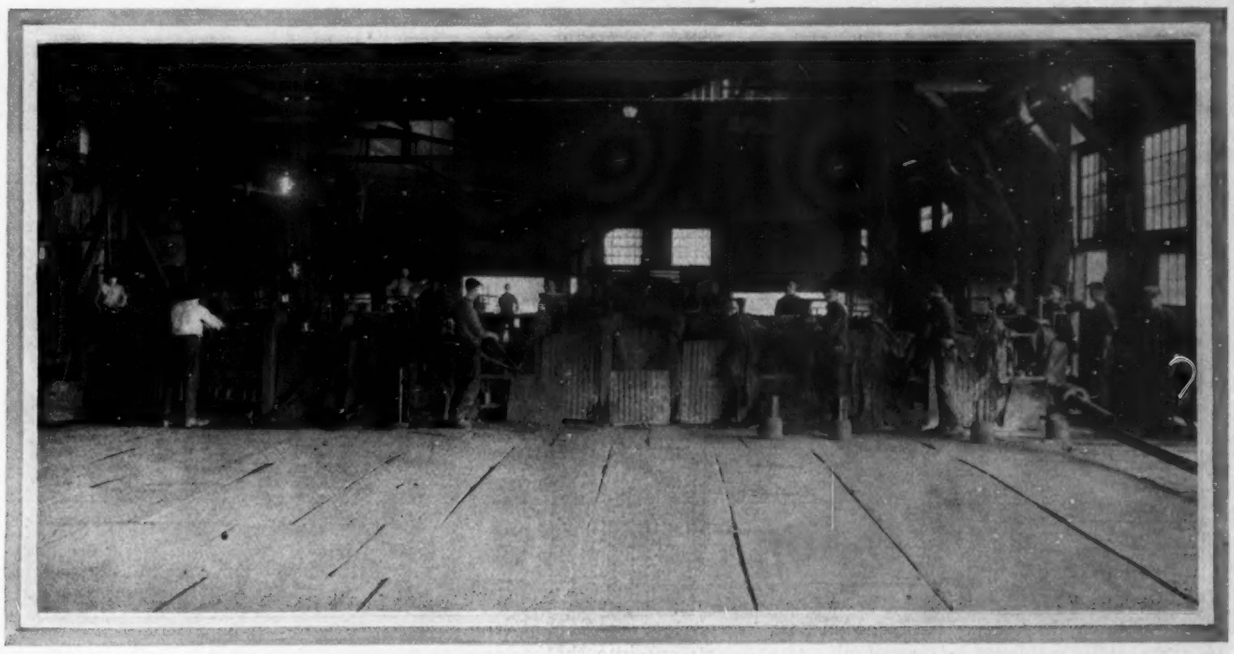


FIG. 7—REAR VIEW OF 10-INCH MILL, SEVEN STANDS

ond two tons and the third 1,500 pounds, each being provided with a coal-fired heating furnace of corresponding capacity. Each hammer, also, is provided with a separate jib crane. The hammer shop is equipped with the usual steam separator for removing the water from the steam before it is supplied to the hammers.

The machine shop, which immediately adjoins the hammer shop, is 40 x 140 feet. It is equipped with five lathes which range from 10 to 36 inches in swing and 8 to 24 feet in bed. They are employed for roughing machine gear blanks, axles and all kinds of miscellaneous forgings. The machine shop further contains five cold saws, ranging from 18 to 40 inches in diameter, shapers, planers, drill presses, etc., all motor-driven.

The metallurgist's headquarters are located in a laboratory equipped with apparatus of the latest types, including electric heating furnaces, suction flasks, water stills, gas furnaces and testing machines. The determinations are made by the methods of the United States Bureau of Standards. In addition to making analyses of all billets and blooms which enter the plant as raw material, analyses usually are made of all finished products, this being especially the case with shapes and forgings for automobile construction and government work.

The power plant recently has been centralized in a new building, 30 x 200 feet. It also has been improved by the addition of a 1,500-horsepower Porter-Allen rolling mill engine, 30 x 42 inches, which is of the latest type manufactured by the Southwark Foundry & Machine Co., Philadelphia. The principal advantage afforded by the new engine is its ability to give rapid changes in speed, any speed desired being obtainable within two minutes. In addition, it has a greater speed range, operating from 80 to 160 revolutions per minute. It is direct-connected to the 12-inch mill and is belt connected to the 10-inch mill; the latter thus has a speed range of 200 to 420 revolutions per minute. The power plant further contains a 100-horsepower engine and generator furnishing current to the various departments of the plant. A 60-horsepower engine, direct-connected to a 30-horsepower generator, as well as a spare 100-kilowatt generator, are held in reserve for use in case of emergency. In addition, there is a 10 x 12-inch air compressor for supplying air for the operation of the pneumatic chippers and a Sturtevant blower for furnishing blast for the operation of the coal-burning heating and heat-treating furnaces. Steam for the power plant is furnished by a battery of six 250-horsepower, return tubular boilers. These also supply steam for the operation of the hammers.

The company recently completed the construction of a new warehouse, 60 x 100 feet. Among other improvements which it now has under way or will commence in the immediate future are: The erection of a new building for the machine shop, 90 x 200 feet; the removal of the heat treatment plant into the building now used as a machine shop; the installation of a 10-ton electric traveling crane to command the raw material and stock yard and the installation of a 100,000-pound tensile testing machine of the Olsen type in the metallurgical laboratory.

One thing that cannot too strongly be emphasized is that safety appliances will not effect the end desired unless the men who use the safety appliances are thoroughly in sympathy with them. You must win the co-operation of your men.

The maximum degree of accident prevention can never be attained by legal enactment and state inspection alone. It requires broad-spirited, intelligent and progressive voluntary action by employers, and continuous, intelligent co-operation by employes.

Northern Crane Trolley

Extensive improvements in trolleys for heavy traveling cranes recently have been made by the Northern Engineering Works, Detroit, and the new trolley is shown in the accompanying illustrations. The primary considerations in the design were safety as regards strength and the protection of working parts, together with accessibility and rigidity. Durability in gears and other moving parts has been sought by designing them so they run in an oil bath which affords protection from dust and grit. The construction is such that the covers of the gear cases must be in place or the gears cannot run; this prevents the accidental omission of the gear covers in assembling the trolley after inspection or repairs.

Each train of back gears is mounted in a single frame; the bearings are bored in line and are capped and fitted with through bolts. The bearing liners are bronze. The hoisting gear train from the motor armature to the drum gear is carried in a single casting which tends to insure permanency of alignment. The drum gear is enclosed with a case of the same general type as that used for the hoist gearing. There are no overhung gears. The gear covers are castings and the joints are planed in order to make a tight construction and prevent the leakage of oil. The covers also are provided with large manholes for purposes of inspection and oiling.

The trolley is provided with a double brake system and a limit stop for the control of the hoisting block. The wiring is placed in steel conduits. This trolley is built in a range of capacities from two to 125 tons for either mill or standard service. The mill service trolleys have axle bearings of either the vertically or horizontally capped Master Car Builders' type.

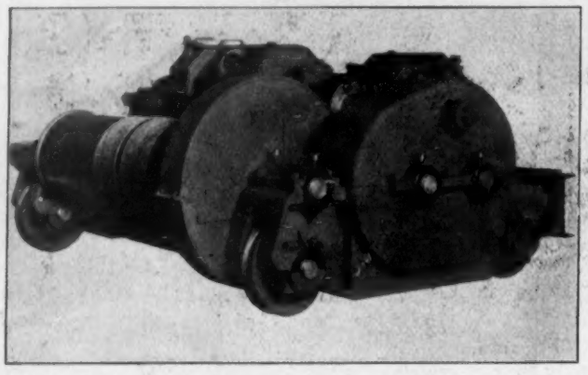


FIG. 1—CRANE TROLLEY GEARING FULLY ENCLOSED

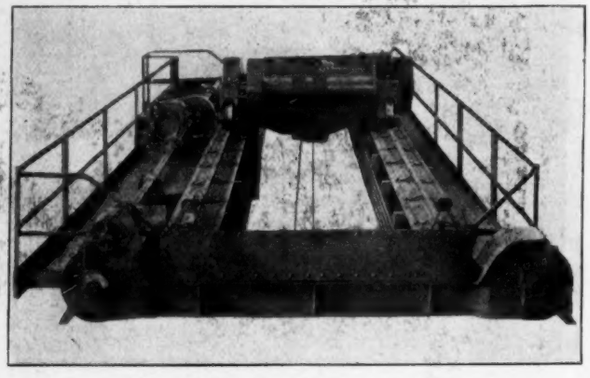


FIG. 2—THE TROLLEY IN SERVICE

A Stoker for Scientific Firing

Details of a Mechanical Stoker Designed to Charge the Furnace Frequently With Small Amounts of Coal

"FIRE light and often" are the instructions given to firemen by engineers who are familiar with the conditions which tend to produce perfect and smokeless combustion in the operation of boilers. Owing, however, to the inherent weaknesses of human nature, very few firemen follow these instructions with any noticeable care. In order to eliminate the inaccuracies on hand firing, mechanical stokers have been introduced. One of the latest devices of this kind is that developed by the Kincaid Stoker Co., Cincinnati. This machine, it is stated, is capable of delivering charges of coal ranging from three ounces to two pounds, according to the capacity of the furnace to which it is attached. The coal is distributed evenly over the grate at the rate of 10 to 75 charges per minute, depending on the requirements of the boiler. This is said to build up a fire which is light and spongy and gives an even and extremely high temperature over the grate.

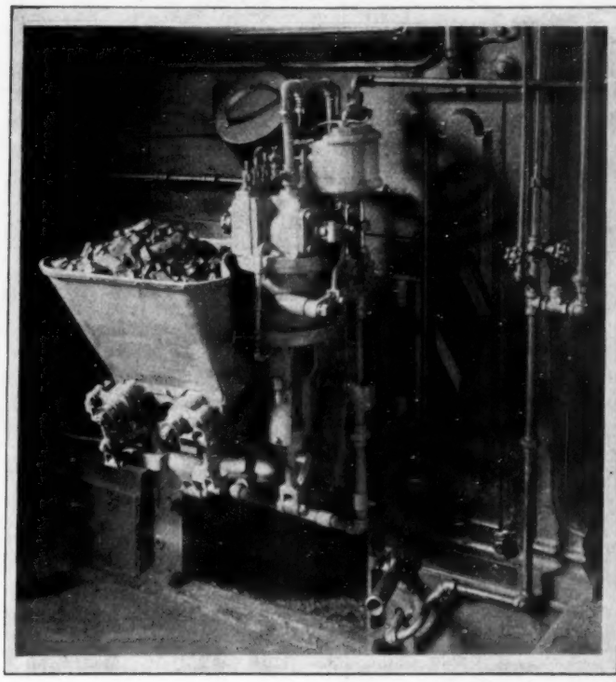


FIG. 1—AUTOMATIC COAL STOKER IN OPERATING POSITION

FIG. 2—STOKER SWUNG AWAY FROM BOILER FRONT FOR CLEANING OR INSPECTION

Fig. 1 shows the stoker in operating position. The entire apparatus is hinged on a frame bolted to the front of the boiler, and no change in the setting or boiler front is required other than the removal of the fire door and the attachment of the stoker. The stoker may be swung clear, as in Fig. 2, for cleaning the fire or for any other occasion that may arise.

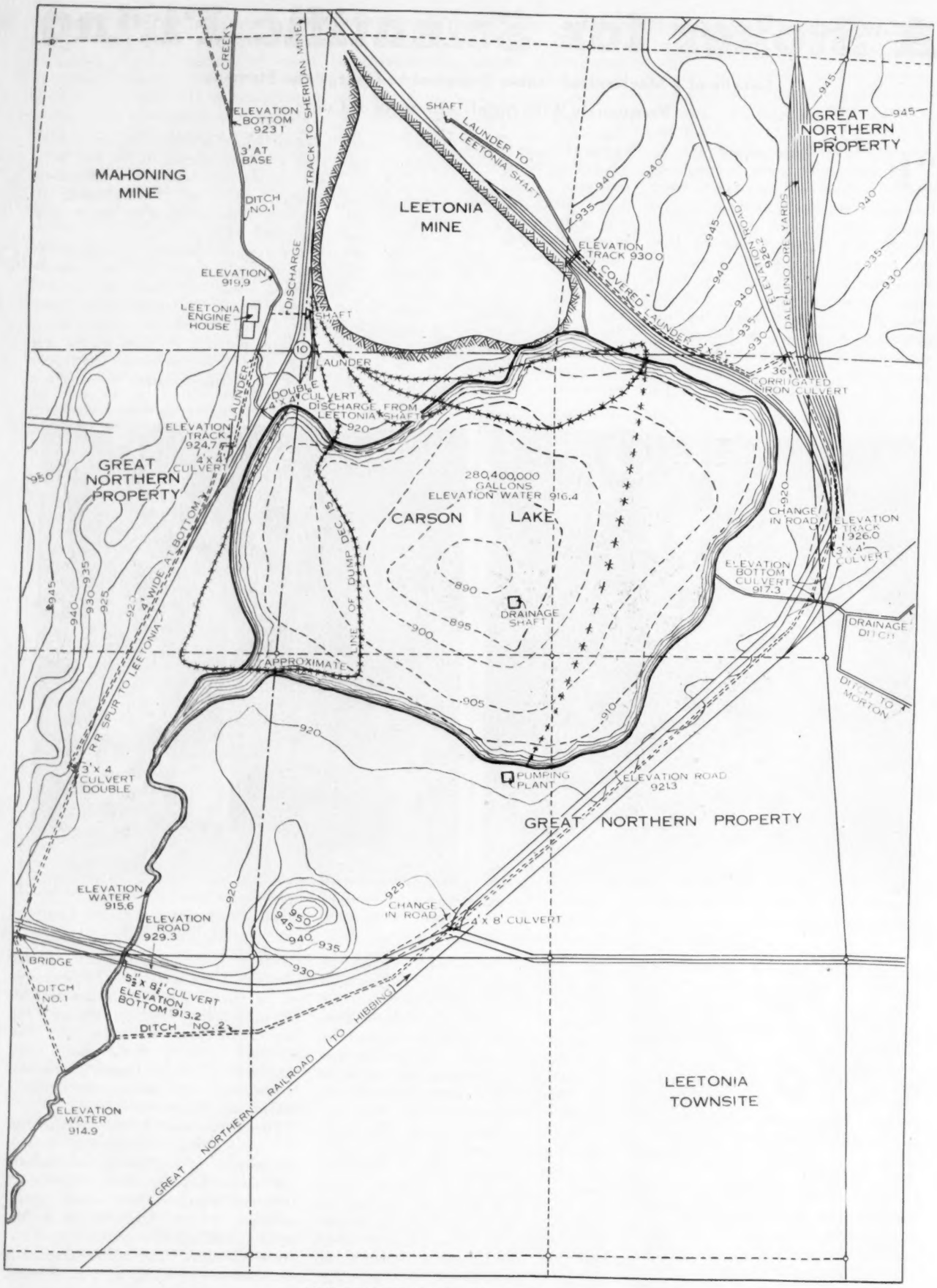
The device is equipped with crusher rolls which make it possible to use coal of any size from slack to 8-inch lump. Also it is stated that mixed sizes, such as run of mine, can be employed. The coal is forced into the furnace by a ram which is actuated by a steam piston. The ram is fed by two worms situated in the bottom of the hopper. They work intermittently so that when the ram is delivering a blow against the coal, no coal is being fed forward. When the ram is withdrawn, the same motion actuates the worm through a predetermined portion of a revolution. Thus the same quantity of coal is fed to the ram for each successive blow. This quantity may be changed by changing the throw of the ratchet arm which controls the motion of the worms.

Steam is admitted to one side of the piston which drives the ram by means of a rapidly acting valve in much the same manner as air is admitted behind the piston of a pneumatic hammer. By means of a special throttling mechanism, the pressures of steam admitted behind the piston are successively varied so the strokes or blows of four different intensities are secured. Therefore the first or weakest stroke delivers a charge of coal over the front quarter of the fuel bed; the second stroke delivers into the second quarter, and so on. The spreading of the coal is accomplished by means of a distributor plate.

The exhaust from the ram cylinder is lead to a ⅜ x 3-inch rectangular nozzle situated immediately back of the distributor plate. The events are so timed that a blast of exhaust steam emerges from the nozzle at the same instant that a charge of coal reaches the distributor plate. This steam catches the coal and assists in spreading it over the various portions of the fuel bed. The intensity of the blasts of exhaust steam vary in the same manner and directly with the intensity of the strokes of the ram. The character of the spreading depends upon the contour of the distributor plate which is varied to suit furnaces of different shapes and proportions.

The fluctuations in the demand on the boiler are accommodated by varying the number of charges of coal thrown per minute and by varying the size of individual charges. The former is the principal method employed, while the latter is resorted to only in cases of extreme variation. The change in speed is accomplished by means of a small steam

(*Continued on page* 152b.)



MAP OF OPERATIONS AT CARSON LAKE

How Carson Lake Was Drained

Description of Unusual Project Now Being Executed by Oliver Iron Mining Co. to Obtain Ore Under Lake Bed

BY H COLE ESTEP

ABOUT two miles southwest of Hibbing, Minn., on the Mesabi range, the Oliver Iron Mining Co., subsidiary of the United States Steel Corporation, is conducting some exceedingly interesting mining operations which involve draining a lake of considerable size and extracting the ore which lies beneath it by underground methods. The body of water in question is known as Carson lake; it is the largest and northernmost of a chain of three lakes, the other two being Kelly lake and Snow Shoe lake. These lakes are connected by a fair sized stream which, under normal conditions, has a flow of approximately 6,000 gallons per minute. Carson lake also drains a considerable area to the north, east and west, and is fed by a stream from the northwest which also has a flow of 6,000 gallons per minute. The general features of the work which is being done by the Oliver Iron Mining Co. are indicated on the accompanying map.

Carson lake has an approximate area of 80 acres. The west 40 acres, in other words the northwest quarter of the southeast quarter of section 10, township 57, range 21, is controlled by the Oliver Iron Mining Co. and is estimated to contain 4,000,000 tons of merchantable ore. The northeast quarter of the southeast quarter of section 10, adjacent to the Oliver company's property, also contains iron ore. This, however, is controlled by the Great Northern trustees and the Oliver company contemplates mining operations only in its own territory.

The lake has an average depth of 14 feet and contains 280,400,000 gallons of water. The bottom of the lake is soft ooze, or muskeg, with a depth of approximately 50 feet. The water was removed by pumping. It was impossible to arrange for natural drainage owing to the very slight flow between Carson lake and Snow Shoe lake. The distance between these two lakes is approximately half a mile and the difference in elevation orginally was only 3 feet. The average grade of the creek joining the two lakes, therefore, is only 0.08 per cent.

In order to divert the water flowing to the lake from the north and west, it was necessary to dig a ditch connecting the creek which flows into the lake with the outlet, thus forming a by-pass. Another ditch was excavated around the south and east shores of the lake to take care of the surface drainage into the lake basin and also the water from the Leetonia shaft. These ditches were excavated by hand and with a machine and their general arrangement is clearly indicated in the accompanying map. The water is led from the Leetonia shaft to the drainage ditch through a covered launder with a cross section 2 x 2 feet. The launder terminates in a 36-inch iron pipe, or culvert, which passes under the highway.

To pump out the lake, two centrifugal, steam driven pumps with a capacity of 2,500 gallons per minute each were provided. The pumps were mounted on skids so they could follow the receding water and during the pumping operation they were moved three times. Steam was furnished from boilers located in a boiler house situated on the south shore of the lake as indicated on the map. The pumping operation commenced on July 1 and was completed in 50 days.

After the lake had been pumped out, it was necessary to drain the muskeg bottom which still contained large quantities of water. The muskeg formed an enormous sponge, 80 acres in extent and approximately 50 feet in depth. To get the water out of this mass of ooze, a drop shaft was sunk in the middle of the lake to a depth of 52 feet and a No. 10 Cameron reciprocating steam pump installed in the bottom. This pump is now at work draining about 275 gallons of water per minute from the muskeg. At the same time, in order to make the floor of the lake perfectly dry, it is being filled with material being stripped from the Sheridan mine located about two miles to the north. The stripping will eventually cover the entire 40 acres controlled by the Oliver Iron Mining Co., together with a small portion of the Great Northern property, the eastern limit of the fill being indicated by the dotted line on the map. The cross hatched lines show the approximate shape of the two fills on Dec. 15. About 1,400,000 cubic yards of filling will be required. As the earth is dumped in, the muskeg is pushed up and outward, until in some places it has rolled up in a mass as high as the fill itself.

Some interesting experiences were encountered in sinking the small drainage shaft in the middle of the lake. When this excavation had nearly reached its limit, it was found that the progress was stopped due to the fact that the material which was taken out of the shaft and thrown to one side returned to the bottom of the muskeg. This was proved by throwing small bags of stones, which could be identified, into the lake with the material excavated from the shaft. These stones later appeared in the bottom of the shaft, showing that the company was excavating the same material over and over again. The excavating operations, therefore, were stopped; the shaft was made tight by a layer of sheet piling driven around the outside and the pump was installed and set to work. By spring it is expected that the muskeg will be nearly drained and the filling will be well along toward completion.

The permanent shaft which will be of concrete construction, will be sunk at a point near the shore of the lake, southwest of the drainage shaft. It will be 225 feet in depth to the first level.

The figures for the filling given above, include only the Oliver Iron Mining Co's property. Eventually, it is expected the whole lake will be filled and this will require 2,500,000 cubic yards.

The Sheridan mine, from which the filling material for Carson lake is being obtained, is a characteristic open pit property which it is estimated contains 4,500,000 tons of ore. The pit when completed will be about three-quarters of a mile long, the stripping being approximately 30 feet in depth.

"Thirty Years of Progress" is the title of a handsome booklet recently issued by the Pawling & Harnischfeger Co., Milwaukee. It covers the growth of this firm from its inception in 1884 to the present time and contains many interesting facts regarding the progress of the crane and hoist building industry in the United States. A brief list of the products of the Pawling & Harnischfeger Co. also is included.

When drawing a punch, die or other tool to color, a little lard oil rubbed on the polishing surface will keep it from smoking up and will give a clear view of the colors as they appear.

Hardening Iron and Its Alloys

Second of Two Articles Discussing Theories of Hardening in the Light of Recent Scientific Research

BY C A EDWARDS AND H C H CARPENTER

SINCE IT HAS NOW been definitely established that the quenching operation produces pronounced crystal twinning in steels and other alloys, it becomes possible to extend Beilby's theory of hardening metals by cold-working to the hardening which is brought about by quenching if it can be shown that the hard amorphous vitreous layers that are formed on the gliding planes during the internal slipping or twinning are retained by quick cooling. Beilby has shown that when metals containing these layers are heated, the latter return to the more stable—crystalline—form, in other words, they re-crystallize, and that the actual temperature at which re-crystallization takes place varies with the particular metal or metallic alloy. Hence, if the rate of cooling is sufficiently quick, the temperature of the mass will be lowered below that at which re-crystallization occurs. In such a case the vitreous amorphous layers formed will be preserved and hardening will result. It would then follow, that the final cause of hardening by quenching is exactly the same as that of hardening by cold-working. In the case of carbon steels and other alloys of a similar nature, the actual stresses that are set up in quenching, and which give rise to the twinning or slipping, are brought into action in the very brief period during which the mass is cooling. Hence, while the metal is undergoing intercrystalline slip, and the amorphous layers are being formed, the chances for these layers to recrystallize become less and less as the cooling proceeds. Indeed it may be that a large proportion of the slipping which undoubtedly occurs actually takes place at a moderately low temperature, and below that at which the amorphous layers are able to recrystallize. The fact that crystal twinning occurs is an indication that the crystal units in the immediate vicinity of the junctions must have become decrystallized. Indeed, according to the views of Osmond, Rosenhain and Ewen, whenever there is a difference in the orientation of crystals, a certain amount of amorphous material exists at the boundaries.

It is now necessary to test whether this hypothesis is in agreement with the established theories, and also to see if there are any experimental facts, which either disprove or support it.

1. The hypothesis is applicable to all alloys which can be hardened by quenching, whether they contain iron or not. The precise degree of hardness which is produced in different alloys by this treatment need not for the moment enter into the question.

2. The types of hardening which result from cold-working or quenching certain alloys are brought into close relationship. In both cases the hardness is due to the formation of amorphous layers that are produced by intercrystalline movement or slip. The precise agencies by which the slipping is brought about are, however, different in the two cases.

3. The hypothesis agrees with one of Osmond's latest statements relating to this question, viz.: "If it were assumed, which it was admissible to do, that in the case of a hardened steel, the average diameter of the actual grain—invisible under the microscope—was also of the same size as the crystalline molecule, the idea might be entertained that in hardened steel the iron might be amorphous. That would correspond to Beilby's hard iron."

4. In some respects it resembles Grenet's hypothesis that "fineness of structure" is the cause of hardening. The only difference is that in our case the fineness is regarded as molecular and referring to one phase only; whereas Grenet regards it as being a crystalline fineness of two or more constituents.

5. So far as we can judge from the present state of knowledge, there is only one property of quenched steels which does not appear to support this view, viz.: all carbon steels are magnetic, no matter how quickly they are quenched from a high temperature. This is undoubtedly a very important fact which merits careful attention, but we would point out that there are now many metallurgists who are of the opinion that the magnetic properties of quenched steels are not definitely and exclusively associated with Alpha iron. It is, for example, quite possible that the above-mentioned amorphous layers, which in quenched steels should be regarded as decrystallized Gamma iron, are magnetic, or in other words, Gamma iron under certain conditions may be magnetic. We intend to draw attention to certain facts which lend strong support to this view, but for various reasons it will be more convenient to discuss them when considering the question of the constitution of the constituent known as "austenite".

Turning now to the question of the degree of hardness that is produced by quenching different steels or alloys, we wish to make it perfectly clear that we do not consider that the degree of hardness is entirely dependent upon the amount of twinning that occurs, unless the comparison is made between specimens of the same chemical composition. The chemical composition certainly has a marked effect upon the quantity of twinning produced in the quenching operation, but the hardness of the mass is also influenced by the chemical composition of the amorphous layers that are formed. This is rendered evident by the fact that mild steel containing, say, 0.20 per cent of carbon, when effectively quenched from temperatures above 900 degrees Cent. is a mass of twinned crystals, but it is, nevertheless, very soft as compared with quenched specimens of steel containing 0.9 per cent of carbon. Beilby has shown that the amorphous layers produced by cold-working possess different properties in different metals, and it is permissible to conclude that the hardness of similar layers in alloys will depend to a large extent upon their chemical compositions and molecular constitution.

There is no doubt that the hardness of quenched steels is directly related to the velocity and thermal magnitude of the suppressed inversion, and the connection between these two factors and twinning has been previously indicated. For instance, it is obvious from a glance at the lines ABC, Fig. 21, that the osmotic or solution pressure, the intensity of which they indicate graphically, increases as the carbon increases from 0.0 to 0.9 per cent,

Abstract of a paper presented at the May meeting of the British Iron and Steel Institute in London. C. A. Edwards, one of the authors, is professor of metallurgy at Manchester University and H. C. H. Carpenter is professor of metallurgy at the Royal School of Mines, Imperial College of Science and Technology, London.

and then rapidly decreases as the amount of carbon is raised to about 1.7 per cent. It should perhaps be emphasized here, that as the osmotic pressure of a liquid solution increases, its freezing point is lowered, as also is the temperature at which a solid solution deposits one of its constituents. Therefore, the maximum osmotic pressure of liquid solutions exists in mixtures which correspond to the eutectic composition, and in the analogous or eutectoid proportions of solid solutions. With regard to the velocity and thermal magnitude of the critical points, it is well known from cooling curve data that the maximum effect in both these respects is found in the eutectoid steel, in other words, at 0.89 per cent of carbon. Thus in steels containing less than 0.89 per cent of carbon, the thermal changes are spread over a range of temperature which increases as the percentage of carbon is lowered, and

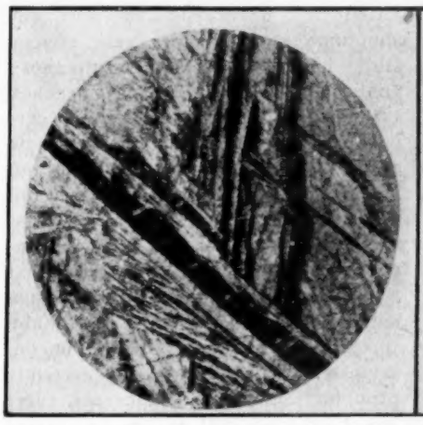


FIG. 16 — STRUCTURE OF QUENCHED ALUMINUM-COPPER ALLOY

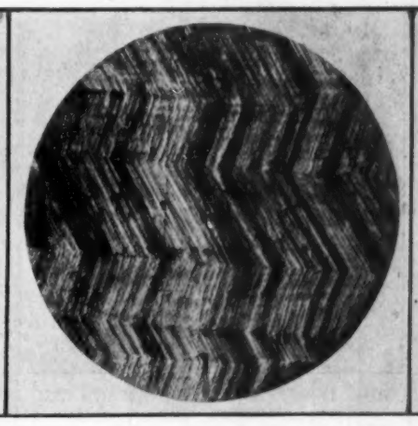


FIG. 17 — SLIP BAND IN STRAINED NICKEL

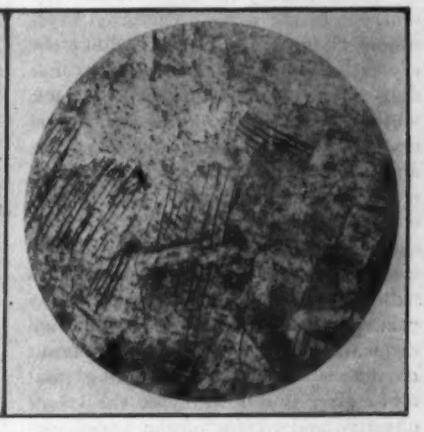


FIG. 18 — STRAINED NON-MAGNETIC NICKEL STEEL

a similar effect is produced when the carbon is raised above 0.89 per cent. Moreover, in the latter case the thermal effect of the separation of the excess of carbon, as cementite, is very weak and can scarcely be detected pyrometrically. As previously mentioned, we have found from the examination of many specimens, that the degree of twinning is greatest in quenched steels containing about 0.9 per cent of carbon. From the above considerations it is, therefore, quite logical to conclude that the amount of amorphous material produced by quenching will be greatest the nearer the steel corresponds to the eutectoid composition, for not only the number, but also the actual thickness of the amorphous layers must be at a maximum in the eutectoid steel, because the temperature through which they may recrystallize is the least. This hypothesis fits in, therefore, with what is known of the relative hardnesses of quenched steels containing varying percentages of carbon. Whatever theoretical explanation is adopted for the hardening of pure carbon steels by quenching, to be of any real value it must also be consistent with the physical data and hardening properties of the so-called special steels. Hence, before drawing any definite conclusions upon this subject, it is necessary to draw attention to some of the more important characteristics of these alloys of iron. Broadly speaking, the effect of the presence of such elements as nickel, tungsten, manganese and molybdenum, etc., upon the critical points as they appear in pure iron and iron-carbon steels, is to retard the transformation from the Gamma solid solution into Alpha iron and carbide. In certain cases the tendency in this direction, which may be regarded as a kind of automatic brake, is sufficient even when the mass is slowly cooled from moderately high temperatures, to completely obstruct all the critical points or ranges. It can, therefore, be safely asserted that the combined action of certain percentages of tungsten, molybdenum, nickel or manganese, along with carbon, is such that the operation of rapid cooling by quenching, which is necessary to suppress the critical points that occur when carbon steels are slowly cooled, can be dispensed with. When the critical points have been suppressed in this way, the steels are in what is known as the austenitic condition. There is, however, no doubt that the general properties of these steels vary within very wide limits.

For example, Hadfield's manganese steel is practically non-magnetic at the ordinary temperature, and so extremely hard under the tool that it can only be machined with great difficulty, but the hardness of the same material according to the Brinell ball-test is only about 200 as compared with that of 700 to 850 for hardened carbon steel. Nickel steel containing about 25 per cent of nickel is also non-magnetic, but it is relatively very soft by whatever method it is tested. In the case of chromium-tungsten and chromium-molybdenum high-speed cutting tools, when cooled from very high temperatures, they are generally regarded as being in the austenitic condition; nevertheless, they are then rather strongly magnetic and certainly very hard. Further, it may be noted at this stage that there are some rather misleading statements in the literature on high-speed steels, to the effect that at their hardest these steels are relatively soft. As a matter of fact, the difference in this respect is extremely little, and most of the high-speed steels now in use are quite as hard as the hardest quenched carbon steel, at least when tested by Brinell's method.

For the time being it may be fairly asserted that from a general physico-chemical point of view, the only difference between the pure carbon steels, and the so-called special steels which come in the class referred to above, is that with the former the suppression of the carbide charge or separation can only be accomplished by external agencies, such as very rapid quenching from high temperatures, while in the latter steels the special elements present give rise to the formation of new compounds which, no doubt owing to their higher molecular weight, exert a greater osmotic pressure when in the iron solid solution, and lower the temperature at which the carbon (as carbide) separates from solution, and also decrease the velocity of that change. In other words, the action of these added elements is such that rapid quenching is not necessary, and the resulting steels are in practically the same physico-chemical condition

as rapidly quenched carbon steels. It is, however, an established fact that the physical, as distinct from the physico-chemical, constitution of the two classes is quite different, for in the case of carbon steels the mass consists of an enormous number of twinned lamellae, while the special steels are composed of relatively large polygonal crystal grains with little or no evidence of twinning. The above use of the term "practically the same physico-chemical condition" is intended to convey the conclusion that both kinds of steels contain the same phases or constituents irrespective of their quantities. For example, owing to the twinning the quantity of amorphous material is much greater in the carbon steels.

In both cases, the thermal or carbide change is inhibited by pressure, but when this is brought about by external means, twinning of the crystals is produced, whereas when the whole of the necessary pressure is already inherent in the mass no internal crystalline disturbance occurs, because the crystal and molecular units are not then interfered with. In other words, when quenching is necessary, intercrystalline movement takes place, amorphous layers are formed, and the mass becomes hardened; whereas when the pressure already exists in the alloy as osmotic pressure, all the internal molecular and crystal units are subject to the same pressure at any particular moment, and no internal dislocation occurs. Under these latter conditions the only hardening that takes place is due solely to the larger quantity and nature of the added elements, or the compounds that are formed therewith, which are held in solution by the Gamma iron, just in the same way as a steel containing say 0.9 per cent of carbon is harder than one with only 0.2 per cent, when both are at a temperature of 900 degrees Cent. From what has been said it follows that the amount of twinning produced will be proportional to the amount of the inversion, which has to be suppressed by external means, such as quenching, or inversely proportional to the retarding influence of the special elements present. Hence twinning is entirely absent when the necessary internal pressure is sufficient, as when the required amount of nickel or manganese is contained in the steel.

As an introduction to the discussion of the constitution of the so-called martensitic and austenitic constituents, we wish to make a few further remarks upon the analogies between steels and those copper-aluminum alloys previously referred to. Both these systems are of a similar constitutional character at high temperatures and pass through almost identical changes as they cool down to ordinary temperatures. At temperatures inside the area *A B C* Fig. 20, the alloys consist of a homogeneous series of solid solutions which correspond to the Gamma iron solid solutions of steels. At temperatures on the line *A B* crystals which are relatively rich in copper separate from solution in exactly the same way as practically pure iron is deposited at temperatures on the line *A B*, Fig 21. With alloys containing more than 12.4 per cent of aluminum, that is, those which fall to the right of the eutectoid point *B* crystals that are rich in aluminum are deposited from solution at temperatures on line *B C*, Fig. 20. This is analogous to the separation of carbide of iron at temperatures on the line *B C*, Fig. 21. The separations which occur in alloys that fall to the

FIG. 19—STRAINED NON-MAGNETIC NICKEL STEEL MADE MAGNETIC BY MECHANICAL DEFORMATION

left of the eutectoid points are accompanied by relatively large evolutions of heat, but the thermal effect of the deposition of Gamma crystals and of carbide of iron is not nearly so pronounced. In all cases the structures of quenched specimens from each series are remarkably similar, especially when the comparison is made between those which fall in approximately the same positions in their respective systems. Now in the case of the non-ferrous series, no difficulty has been experienced by metallographists in arriving at a general understanding as to what such types of structure should be called. They have been content simply to describe the acicular structure as the Beta constituent, which, strictly speaking, means it is the typical structure of alloys that have been quenched from temperatures at which the Beta constituent is stable. This kind of nomenclature is absolutely non-committal, yet it conveys a definite and accurate idea of the treatment to which the specimen has been subjected, and is a true foundation upon which to build a hypothesis as to its nature. For many years no serious question appears to have been raised as to why this apparently duplex structure was always produced by quenching, nor why it was generally regarded as evidence of only one constituent. Now, however, there is not the least doubt that the nomenclature adopted was extremely fortunate, for it has been conclusively proved that the markings are merely due to crystal twinning and that the peculiar effect is due to the difference in the orientation of the twin lamellae. In other words, there is no difference whatever in the constitution of the light and dark areas; they are due to the angle at which the light rays strike the twin crystals. Since that is the case it is especially significant to note that the appearance seen in Fig. 16, which is characteristic of quenched 13.2 per cent aluminum and 86.8 per cent copper alloy, is almost identical with those published by Osmond of a quenched 1.60 per cent carbon steel. For certain reasons Osmond gave the name austenite to the white background and martensite to the dark areas, and those names have been used by almost all metallographists, in such a manner as to convey the meaning that they are totally distinct constitutional entities. In some instances, no doubt, this has been done, almost unconsciously, but in others it has certainly been intentional. At all events, there has been and still is an impression that the areas to which those names are applied correspond to separate metallographical constituents. By far the most important publication which supports this view is the one by Benedicks. In this paper each fact is carefully advanced and examined in a perfectly logical manner. In regard to the constitution of austenite and martensite Benedicks says: "Thus there is not a single cause for assuming a different empirical composition between martensite and austenite, and the difference in their properties on etching, etc., must be attributed to the different state of the iron: Gamma iron in austenite and probably Beta iron in martensite." At a later date one of the present authors suggested that the martensitic markings were twinned lamellae, a view which, if correct, would mean that they are really of the same constitution as the white background. As will be observed from a perusal of Benedicks' paper, the dominating factor in this problem is the question of the magnetic proper-

ties of quenched steels. On that account we should like to draw attention at this stage to a very interesting fact, which we think is new, and which seems to be of great theoretical significance. In an earlier part of this paper we expressed the view that there may be no necessity to associate the magnetic properties of quenched carbon steels, in other words, those containing martensite with the presence of Alpha iron. As an alternative, we think it is quite possible that the amorphous layers which exist between the twinned lamellae are the cause of the magnetic properties, that is to say, that decrystallized Gamma iron, under pressure, is magnetic within the range of temperature during which it can exist without rapidly recrystallizing. So far as we know there is no theoretical objection to this view, but we were anxious, if possible, to carry it beyond mere speculation.

In order to test it we adopted the following line of reasoning and experiment: If the hypothesis is substantially correct, it should be possible, by artificially producing amorphous layers in a steel consisting only of Gamma iron containing other elements in solution (and which is also in a stable condition at the ordinary temperature and consequently non-magnetic) to make that steel become magnetic. Accordingly a thin piece of non-magnetic nickel steel containing 25 per cent of nickel was bent to and fro about 12 times. After this treatment it was found that the metal was strongly attracted by a magnet. When the specimen was afterwards annealed at a bright red heat for about 15 minutes the magnetic properties disappeared. The metal could thus be made either magnetic or not, at will. Now when such a steel is treated in this way it seems quite out of the question to suppose that either Beta or Gamma iron can enter into its composition, because the bending was done at a temperature above that at which either of these types is formed.

When a polished section of nickel steel is slightly strained and then examined under the microscope without etching, slip lines become evident which run from twin to twin, such as are seen in Fig. 17. If, however, the specimen is again polished and also etched, these lines cannot be detected unless the straining has been very severe and the steel thereby rendered magnetic. Under these latter conditions slip lines may be easily observed, and also thin twin lamellae that are very like Neumann lines. See Figs. 18 and 19. From the above facts we are justified in concluding that when Gamma iron is severely strained the crystal units at the surface of slip become decrystallized, and as a result of this the mass becomes both magnetic and hardened.

We readily accept the experimental data which have been published by Osmond and Benedicks, and, with the possible exception of a few minor details, we fully acknowledge the soundness of the latter's arguments. But we are nevertheless persuaded that the final conclusion may be at fault, in consequence of a possible inaccuracy in the fundamental assumption upon which his argument is based, viz., that there is a difference in the physico-chemical constitution of the areas considered. In other words, if this assumption is accepted and is considered, along with the above experimental data, we should arrive at the

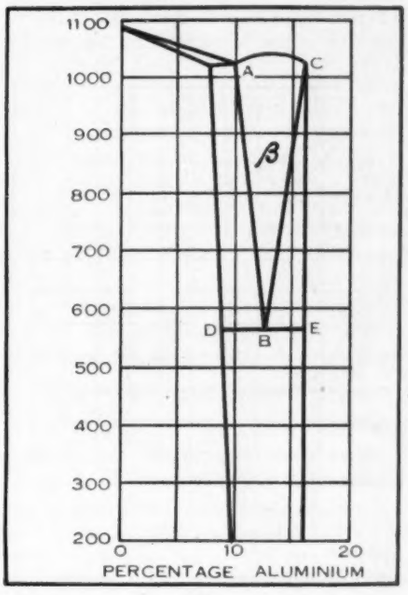


FIG. 20 — DIAGRAM SHOWING PERCENTAGE OF ALUMINUM

same conclusion as Benedicks, but it does not necessarily follow that it would be correct. In any case, so long as there are any other suggestions advanced which are both feasible in themselves and in harmony with the various known phenomena, they should be carefully weighed before any final decision is made; and if this is done impartially there need be no fear that the matter under discussion will become more complicated. It is in this spirit that we now wish to examine the suggestion which was made by Edwards, viz., that there is no physico-chemical difference between the martensitic and austenitic areas of a quenched steel, and that the apparent difference is an optical effect due to twinning; in other words, that martensitic and austenitic areas represent twin crystals of the same constituent. At the outset at this part of the discussion we wish to admit that we have not yet been able to obtain photographic proof of this view, but visual examinations of specimens under the microscope certainly support it. The reason why it is so difficult to obtain photographic evidence in this connection is, because the structures of these quenched steels are so fine as to make it absolutely necessary to use high-power objectives and vertical illuminations, in order to distinguish clearly between the dark martensitic and light austenitic areas. With high power objectives it is practically impossible to get clear definition by means of oblique light, and this is the only way at present available of deciding conclusively whether the dark and light effects are due to crystal twinning. Fortunately, however, we are now able to bring relevant, circumstantial evidence to bear upon this, the weakest side of the question. From a physico-chemical and metallographical standpoint an alloy with 13.2 per cent of aluminum and 86.8 per cent of copper is the same as a steel with, say 1.6 per cent of carbon. They pass through similar thermal and constitutional changes on cooling; they each contain an excess of the alloy element (respectively aluminum and carbon) over that of the eutectoid composition, and while they both possess the same kind of microstructure after quenching from above their highest critical point, that obtained in the copper-aluminum alloy may be more conveniently examined because it is so very much larger. Thus compare the appearance and magnification of Fig. 16 with Osmond's classical illustrations of the so-called martensitic and austenitic areas.

Since it is now known with certainty that the dark areas in Fig. 16 are constitutionally the same as the adjacent light areas, and that the two are really twinned crystals of the same constituent, we may be permitted at least to infer, by analogy, that the same applies to carbon steels.

It is now necessary to turn to the experimental facts relating to this question and see if they can be explained on this hypothesis as clearly as on the other.

The chief factors to be considered in this connection are that the magnetic properties, that is, the permeability and the power of becoming permanently magnetized, of quenched steels containing the martensitic and austenitic areas decrease as the amounts of the latter increase.

At this stage only those steels containing over 0.89 per cent of carbon should be taken into account, because it is only in such instances that

the so-called austenitic areas exist; and as the comparison of the differences is made between martensitic and austenitic areas, it should be confined to those cases where they are of the same composition and exist together. There are indeed wider variations in the magnetic properties of purely martensitic steels than in those containing martensitic and austenitic areas. Now it has been shown that a non-magnetic, austenitic, or pure Gamma iron steel may be made magnetic by straining. This operation produces internal slip upon the gliding planes, which results in the formation of amorphous layers at those surfaces. We are justified in associating the magnetic properties thus induced with the presence of the amorphous layers. Hence, as the quenching of carbon steels gives rise to severe straining and crystal twinning, with the formation of amorphous layers similar to the above, it is only natural to expect that the magnetism will disappear in proportion as the austenitic (untwinned) areas increase. But so long as any twinning exists the magnetic properties cannot entirely disappear. This is in perfect agreement with actual experimental facts, and appears to us a very probable explanation of the impossibility of producing non-magnetic carbon steels by quenching.

The well-chosen magnetic experiments performed by Benedicks do not exactly prove that the martensitic areas are in themselves more magnetic than the austenitic areas. It is, for example, quite reasonable to regard the martensitic areas as non-magnetic twinned lamellae, which are surrounded by magnetic amorphous layers, for the same magnetic effects observed by Benedicks would be obtained. The iron would be deposited upon the thin lamellae, because the magnetic lines of force would be concentrated around them.

The fact that the so-called austenitic areas of quenched carbon steel appear to change into what are regarded as martensitic areas when immersed in liquid air, is quite consistent with the idea of twinning, because the extra strain put upon the mass would cause further twinning, particularly in those areas (austenitic) which had previously escaped this change. It is also of some importance to note that the relief patterns produced on polished specimens that have been cooled in liquid air do not necessarily indicate that there has been an actual increase in volume, for as a matter of fact exactly the same kind of relief forms are produced when previously polished specimens of the copper-aluminum alloys, already referred to, are quenched from temperatures about their highest critical point, but the specimens so treated actually occupy a smaller volume than if they were cooled. Even if it is found that these specimens occupy a slightly larger volume than before being cooled in liquid air, it would agree with the facts relating to the change from the crystalline to the amorphous condition, because Beilby has shown that this is accompanied by an increase in volume.

As regards the non-existence of austenitic areas at the surfaces of a quenched steel, it may be pointed out that exactly the same applies to areas of similar appearance in the copper-aluminum alloys. We have repeatedly noticed that in these alloys very quick quenching rates produce thin twin lamellae (like martensitic areas), whereas with slower quenching velocities the same sized specimens would

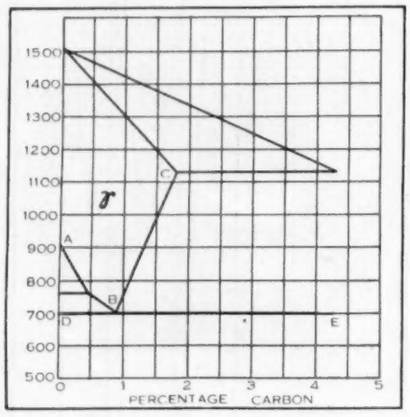


FIG. 21—PERCENTAGE OF CARBON IN IRON SOLUTION

show much larger twins (corresponding to austenite. This is rather a significant fact, in view of what has been said about the increased pressure of martensitic areas at the surface preventing the austenitic transformation in the interior. If the retention of austenite is in any way due to the pressure of the martensitic areas, then it ought to be possible to obtain almost pure austenite in certain parts of the specimen by arranging to produce a positive pressure in the interior of the mass as well as on the outside. Thus by allowing the carbide change to take place in the central part of a specimen, the increased volume which would then occur in that area would exert a kind of back pressure upon the untransformed material surrounding it. Hence as it is possible to obtain from 60 to 70 per cent of the austenitic areas without any of the carbide change having taken place in any part of the mass; if the pressure of the martensitic areas is the cause of the retention of the austenitic areas, it ought to be possible to obtain much more of the latter when both these pressures are operating in the same direction. Up to the present it has not been possible to produce in any part of a quenched carbon steel more than about 70 per cent of the austenitic areas. This is a very significant fact, for if the effect is due to crystal twinning, it can never be possible to obtain a purely austenitic carbon steel at the ordinary temperature, even with the quickest possible rates of quenching. In the present state of knowledge, therefore, we are of the opinion that there is not a single fact which proves that there is any difference whatever in the constitution of martensitic and austenitic areas, and, further, that no facts can be advanced in support of that view, which are not also quite as readily explained by the view that the effects are due to crystal twinning. On the other hand, while it has not yet been definitely established that the martensitic areas are really twin crystals of austenite, this view is not only rational, but is supported by the facts relating to other alloys which are of the same physico-chemical nature.

In regard to the annealing or softening of metals by heating them to moderately high temperatures, followed by slow cooling, we conclude that this operation consists in promoting the growth of the crystals. The softening of the mass which is brought about in this way is due to the gradual elimination of the hard amorphous material which exists as envelopes around the crystals, and not to any change in the nature or hardness of the crystals themselves. The growth of crystals is in all probability caused by the unstable nature of the amorphous material, which tends to recrystallize. This recrystallization increases as the temperature is raised, and must proceed by the gradual growth of certain crystals at the expense of others. During this process the amorphous envelopes act like ordinary electrolytes, whereby the substance of one crystal is transposed to another.

In the operation of quenching such alloys as carbon steels, severe stresses are set up which cause very pronounced crystal twinning. This twinning appears to be directly connected with the intensity of the thermal changes that occur when the mass is slowly cooled, and particularly with the carbite of Ar1 inversion.

The increased hardness which is produced by quenching steels from temperatures above their highest critical point is directly related to the

(*Continued on page* 152b.)

Future of Birmingham District

The Panama Canal and the Canalization of the Black Warrior River Will Have an Important Influence on Southern Iron Industry—Events of the Past Year in the South

BY RALPH R SILVER

WHAT will the completion of the Panama canal and the canalization of the Black Warrior river between Birmingham and the Gulf of Mexico mean to the iron and steel industries of Alabama?

Men conversant with conditions in the Birmingham district, which comprises so nearly all of the iron mining territory of Alabama that the industry in the state usually is so designated, aver with emphasis that the two canals will so place the resources of the district in touch with markets of not only the Pacific coast, but the Atlantic as well, that the one and really only great problem yet unsolved in the iron industry of Alabama—the marketing of pig iron after the ore has been smelted—will be very nearly solved for ever and aye. The one connecting link in this argument, it appears, is the canalization of the Warrior river by means of which the Birmingham district will be placed in connection with the big ditch across the isthmus by direct water route to the Gulf of Mexico. Government work in the way of a series of locks has progressed on the Warrior to a point 15 or 20 miles north of Tuscaloosa, Ala., and about 40 or 45 miles south of the city of Birmingham itself. At this point, construction on Lock 17 has been under way for some time, but temporarily has been held up, word from Washington being to the effect that the government was compelled to do so on account of pressure from other sources for public moneys.

In reality, although not in effect, the Birmingham district is now in touch with the gulf by tidewater navigation; for barges for some time have been operating on the Warrior from Tuscaloosa south, laden with the products of the mines and furnaces of that section, which in reality is a part of the Birmingham district. How long it will be until the product of the district proper will find its way to the gulf ports at water rates, it would be hard to say, but that such eventually will be done and that the time in which it will be accomplished has been brought much nearer by the year 1914 cannot be denied. Already reports from the Pacific coast have been circulated in regard to the advantages both to that section and to the iron industry of Alabama from the service of the Panama canal. And in that direction only can the iron industry of the state develop. The ore is here in almost inexhaustible quantities; its low grade is made up for in its accessibility to the coal and fluxes needed to smelt it; the problem has been how to market the pig iron or the finished product in a competitive market and pay big freight bills.

And that brings up another subject. During the year, a decision was made by the interstate commerce commission, in what has been dubbed the "Sloss-Sheffield case", making certain reductions ranging from 35 cents to 65 cents on pig iron between Birmingham and practically all consuming points in the middle west, north and east. Opinions of this reduction in rates differ as to whether or not it will greatly benefit the Alabama iron industry. The merchant furnacemen, of course, hail the reduction as the beginning of a new era; others are inclined to believe it will mean little, if anything, in the ultimate working out of the problems of the Alabama iron industry.

The Home Market

As long as Alabama ships her pig iron to the north and east, sells it there in a competitive market at a price that must be less freight charges and then, in effect, buys the same pig iron again in the form of finished product and pays freight on it again back to Alabama, there is a great chance to dispute the value of not only the reduced rates of the interstate commerce commission, but even the services of the Panama canal and a navigable Warrior river. Therefore, if considered in this light, a particular significance is attached to the semi-annual meeting of the American Iron and Steel Institute in Birmingham the latter part of October, bringing, as it did, a large number of the foremost iron and steel men of the country to the Alabama iron ore district for the first time.

Home consumption of Alabama's pig iron and then home consumption by the southern states of the finished product of the Birmingham district seem to be the really sound basis of the future of the district, the surplus finished product then being sent to the markets of the world via the navigable Warrior and the Panama canal or with the help of decreased freight rates through the graces of the interstate commerce commission. Realization of this "dream of empire" undoubtedly was brought nearer during the institute meeting when men high in the councils of the great corporations controlling practically all of the ore properties of Alabama came here and had facts impressed upon them as never before had been done by words, written or spoken. Some of these men even went so far as to express their opinions in favor of developments here in the way of plants to make of Alabama's pig iron production finished product. In years to come, events of great importance to the iron industry of Alabama may be traceable to the institute meeting in Birmingham in 1914.

Actual mining developments of the year have been few. The Gulf States Steel Co. is now busy opening a new slope mine near Oxmoor, where this company controls 1,604 acres of red ore lands. This company is not making pig iron now for the open market.

At Russelville, Ala., the Sloss-Sheffield Steel & Iron Co. has built what in this day has come to bear the cognomen of "model industrial town". It is said to be one of the best in the country from the standpoint of sanitation and general welfare conditions for the employes of the company.

The Republic Iron & Steel Co., at its Raimund mine, has constructed a new change house, accommodating 365 men with compartments for both white and black and equipped with baths, lavatories, swimming pools, lockers and all the accouterments that go with such an institution. This company is now operating all of its five ore mines, three red ore and two brown ore properties. Two of the company's three furnaces are now operating, No. 1 having been relined during the year.

Improvements at the Woodward Iron Co.'s plants at Woodward, Ala., were described in the issue of THE IRON TRADE REVIEW of Nov. 12, 1914. They include a new blast furnace, a by-product coke plant, blowing equipment and improvements to the railroad which operates between the mines and furnaces of the company.

The Tennessee Coal, Iron & Railroad Co. remodeled Ensley furnace No. 1 and rebuilt its Ensley furnace No. 6. This company has operated

11 furnaces at various times during the year, but not all continuously. Practically all of the Tennessee company's 15 mines on Red Mountain were in operation during the first half of the year 1914, but since that time operations have been considerably reduced. This company has built 200 new tenement houses of the most modern type of industrial construction, being equipped with running water, concrete curbs and gutters, parks laid out and landscape work done. A new school for white children has been constructed at the Muscoda division and additions have been made to the Muscoda and Fossil negro schools, necessitated by the growth of interest in education among the negro miners' families. These schools are equipped with modern, standard apparatus such as is found in public schools of the country.

TYPE OF BARGE USED ON BLACK WARRIOR RIVER

Pig iron production for the past 40 years at intervals of 10 years with the figures for 1913 and 1914 added, was as follows for the Birmingham district:

Year.	Tons.
1872	11,171
1882	100,680
1892	915,296
1902	1,472,211
1912	1,862,909
1913	2,025,378
1914	1,795,082

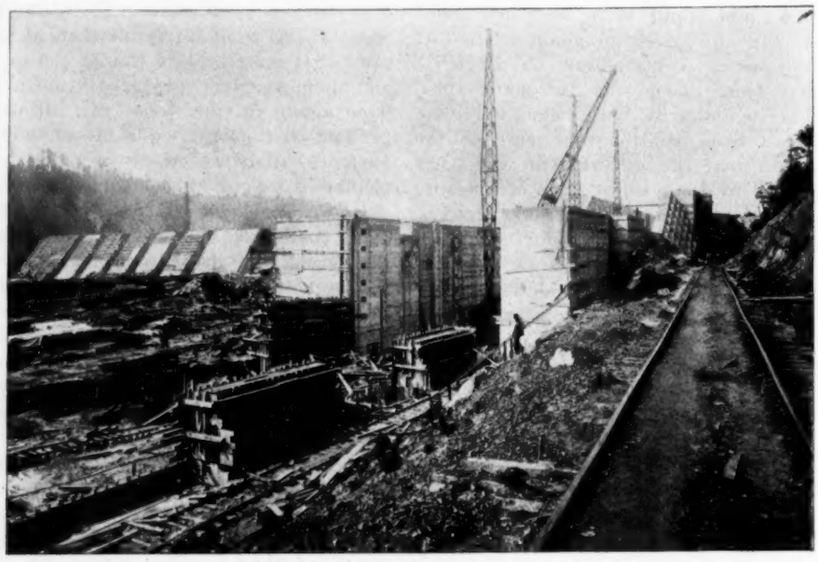
During the year there was in evidence a steady and persistent disposition in the Alabama iron and steel industry to retrench. Valiant efforts were made by different interests at intervals during the year to brace up conditions and put some life into the market. No permanent results were obtained and quotations on pig iron for the year show a slow, but steady decline until the last quarter closed with considerable iron being sold at and below $9.50.

During the first half of the year, mine and furnace activity was near normal in spite of the effects then being felt of the business depression, which during the summer became acute, probably more so in the south than in other iron and steel districts. Furnace activity even for the third quarter was beyond doubt unjustified by business conditions, but toward the end of the third quarter and during the fourth, many of them closed down, mines went out of operation, finishing mills were put on 25 per cent operation and in some cases less, and the iron and steel interests assumed their present policy of watchful but hopeful waiting. Many of the south's iron and steel men hold out little hope for the new year, or at least the first half of it. They state that there are three things which must have some adjustment before conditions in the south really improve—the cotton situation, the attitude of the administration toward big business, and the war—and they have little hope of seeing all three in satisfactory shape by six months or even longer.

New York as Steel Center

The industrial bureau of the Merchants' Association of New York has issued its first bulletin devoted to the opportunities for the production of iron and steel products in the New York district. The booklet, which contains 34 pages, sets forth the advantages of New York harbor for the production of pig iron and steel, giving rather detailed information on the cost of assembling ore, and cost of fuel, limestone, scrap and labor. Freight rates and data on the cost of reaching the markets also are given. A special chapter sets forth the advantages of New York for plants manufacturing hardware, machinery and machine shop equipment, electrical machinery, stoves and heating apparatus, architectural iron work, etc. An interesting terminal map of the New York district is included in the booklet.

Remember that drills are cutting tools the same as lathe tools. Watch the drill chips just the same as you would the chips from the lathe tool. Try to grind the drill so that the chips will come out in a small compact roll. This means that the drill is cutting easily, and the chips will curl out of the holes themselves.



LOCKS UNDER CONSTRUCTION

Light Ore Movement to the East

Policy of Reducing Stocks Generally Adopted and New Buying Was in Small Volume—Large Ore Shipments From North Africa

BY C J STARK

FOR a period when many furnaces have been forced into a state of indefinite idleness, and have been liquidating stocks and adopting every practical expedient to cut conversion costs to meet the necessities of a poor pig iron market, eastern iron ore conditions in 1914 have followed the normal and expected course. The movement of ore during the past year to furnaces in eastern and central Pennsylvania, Maryland, New Jersey and New York, has been the lightest in seven years. Reduced operations or idleness of the mines in eastern territory, which regularly furnish a considerable portion of the requirements of the section and the relatively small imports of foreign ore, have clearly measured the contracted demand. The movement of foreign ore to the United States in 1914 was the lightest since 1908.

At the beginning of the year, considerable stocks of ore had been accumulated on the banks of eastern furnaces, due to declining operations. As the iron market continued depressed, operators generally adopted the policy of converting these stocks and of holding back their incoming shipments of new ore. As a result, a considerable absorption of the stocks was effected throughout the year. It is estimated that total ore stocks held by eastern furnaces at the close of 1914 were about 1,000,000 tons, of which one steel maker was credited with having 400,000 tons and another with 250,000 tons.

The demands of conditions sharply curtailed the volume of new sales of ore made in the year and depressed the prices that consumers could or would pay for their mineral. The ore of standard quality, running from about 55 to 60 per cent in metallic iron sold in the year, averaged on the basis of about 7 cents per unit at tidewater. This price applied especially to foreign ore. Lower quality ore, as well as the higher grade ores forced to sale in isolated cases were taken at 5½ to 6 cents per unit at tidewater. Local eastern ores brought from 6½ to 7½ cents per unit, delivered at the furnaces, depending upon quality and point of shipment. This is equivalent to about 5½ cents per unit at the mines. For foreign low phosphorus ore, the market was at 8 cents per unit at tidewater. Very few purchases of Lake Superior ore were taken in the east during the year. The taking of 60,000 tons by the Alan Wood Iron & Steel Co. is thought to have been the largest transaction. The usual small lots of lake manganates and siliceous ores were consumed by eastern furnaces. At the prevailing schedule, Lake Superior ores have been quoted at about 8.6 cents per unit, delivered in the Lehigh and Schuylkill valleys for old range non-bessemer, and at about 8.35 cents per unit, delivered, for Mesabi non-bessemer. The lake bessemer ores find little demand normally in the eastern market.

The imports of foreign ore to the United States in 1914, aggregated about 1,419,000 tons or about 1,175,000 tons less than in 1913 and were the smallest since 1908, when 776,989 tons were brought in. The foreign movement in 1914 approximated that of 1907, which showed imports of 1,220,168 tons. Shipments of trans-Atlantic ore in 1914 aggregated about 410,000, compared with approximately 500,000 tons in 1913. The only trans-Atlantic ore to show an increase in shipments to this country last year was that from North Africa.

Cuban Shipments Were Light

Cuban ore mining and shipments to the United States in 1914, were the smallest since 1908. The shipments aggregated about 850,000 tons, as compared with 1,582,431 tons in 1913, 1,397,797 tons in 1912, 1,163,714 tons in 1911, 1,462,498 tons in 1910, 936,132 tons in 1909 and 620,836 tons in 1908. The shipments last year were divided into about 580,000 tons from the Daiquiri or south coast district and about 270,000 tons from the Mayari or north coast deposits. In 1913, the movement was 1,080,728 tons from Daiquiri and 491,713 tons from the Mayari mines.

The Spanish-American Iron Co. in 1914 mined and shipped about 290,000 tons from its south coast properties and 270,000 tons from the north coast. North coast shipments were the smallest since they began in 1910. This company's mines throughout the year were operated about on the basis of 50 per cent of capacity, which was due both to the reduced blast furnace activities of the Pennsylvania Steel Co. and the Maryland Steel Co., which control the Spanish American Iron Co. holdings and to the decision to work off the liberal stocks of ore that were on hand at Sparrows Point and at Steelton at the opening of the year. These stocks on Jan. 1, 1914, were about 400,000 tons. At the present time, they have been reduced to about 250,000 tons.

The Juragua Iron Co., the subsidiary of the Bethlehem Steel Co., last year shipped about 220,000 tons, compared with 369,213 tons in 1913, 360,094 tons in 1912, 355,132 tons in 1911, 318,814 tons in 1910, 356,659 tons in 1909 and 366,580 tons in 1908. Mining operations of the Juragua Iron Co. were suspended in September and still are idle. Their resumption will depend upon the revival of trade in the iron and steel industry.

Merchant shipments of Cuban ore during 1914, amounted to about 70,000 tons, the Punopo Manganese Co. furnishing about 60,000 tons from its south coast deposits and the Spanish-American Iron Co., about 10,000 tons. These sales were made on the basis of about 7 cents per unit, tidewater, for the ordinary bessemers and at about 8 cents per unit, tidewater, for the low phosphorus quality. The mines of the Punopo Manganese Co. were shut down for nine months of the year because of the dullness of the eastern ore market and resumed in September, when a round block was sold to an eastern Pennsylvania furnace. At the close of the year, the company had a considerable order book on hand.

A comparatively new foreign ore which has come into first prominence in the eastern market is the El Capitan ore, from the Province of Tunis, North Africa. This ore first was introduced to eastern furnaces in 1913, when a limited quantity was taken. During the past year, the sales of this ore to this country were raised to about 150,000 tons, of which 50,000 tons were shipped and the remainder was under contract for later delivery at the year's close. This ore is a soft hematite of bessemer quality, averaging about 60 per cent in iron content. A typical analysis of this ore shows the following: Moisture, 2.872; peroxide of iron, 86.114; protoxide of iron, 0.514; metallic iron, 60.680; manganese, trace; copper, trace; chromium, nil; lead, nil; sulphur, 0.093; alumina, 0.825; silica, 4.580 and phosphorus, 0.037.

The El Capitan mines are located at Douaria in Tunis, about 20 miles back

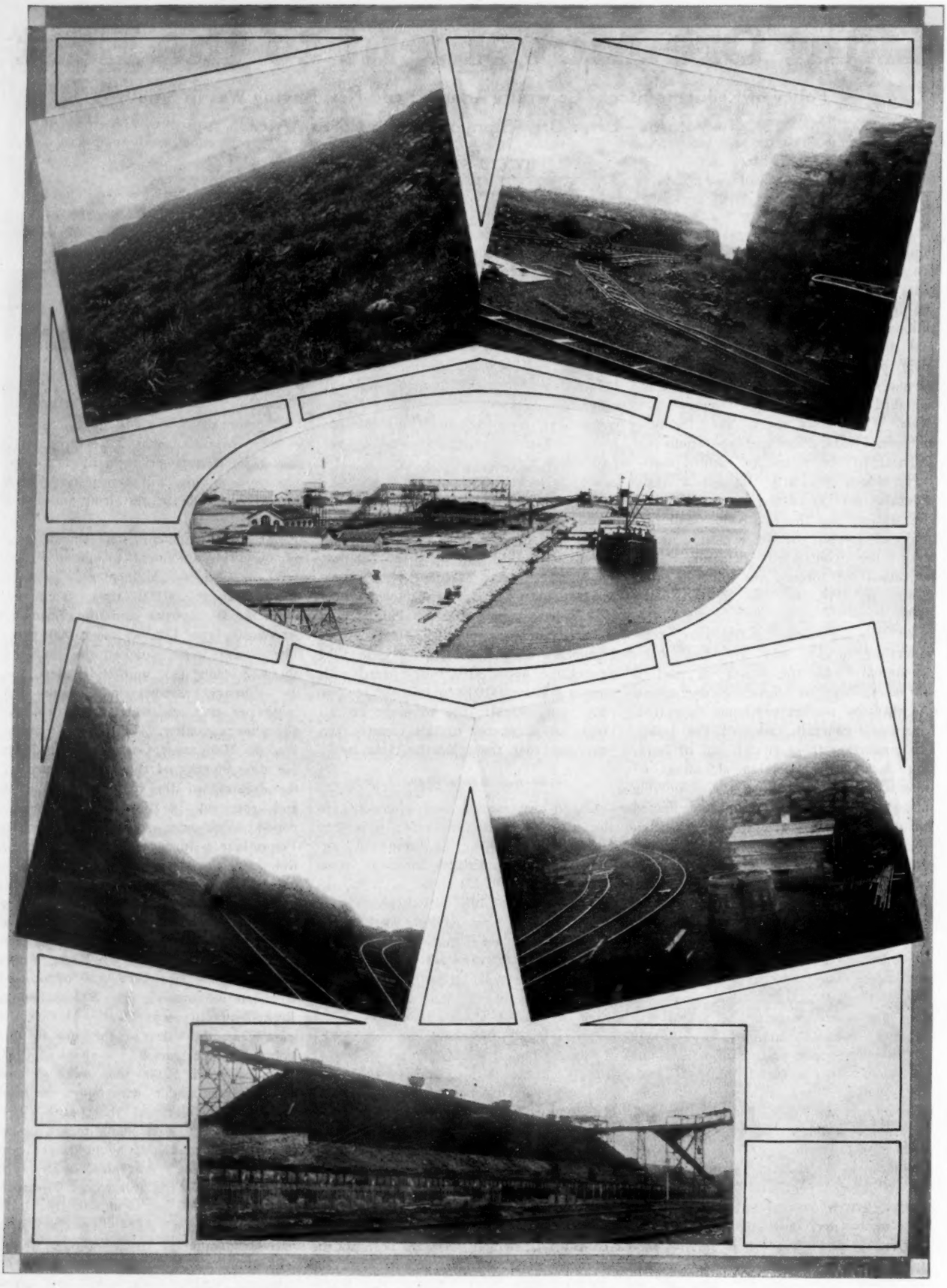


FIG. 1—SURFACE ORE AT DOUARIA, TUNIS, DEPOSITS

FIG. 2—EL CAPITAN MINES, TUNIS, SHOWING SURFACE WORKINGS

FIG. 3—LOADING PLANT AND STORAGE BINS AT BIZERTA, TUNIS, NORTH AFRICA, SHOWING STEAMER BEING LOADED

FIGS. 4 AND 5—ADDITIONAL VIEWS OF THE EL CAPITAN MINES, STOCK PILE ON RIGHT OF FIG. 5

FIG. 6—ANOTHER VIEW OF STOCK PILE AT DOUARIA MINES

from the port of Bizerta on the Mediterranean and are in French territory. They are of recent development, having been brought to a shipping state by French capitalists during the past few years. The ore body is very large and is so accessible that surface mining is employed as shown in the accompanying illustrations. The mining plant, railroad facilities for transporting the mineral to the coast and the shipping and storage capacity, are of the most modern and complete character and have been provided for large tonnage possibilities. The present plant, it is estimated, can furnish and handle about 400,000 tons annually. The storage bins at Bizerta have a capacity of 50,000 tons. If the eastern iron industry undergoes any appreciable revival during the coming year, a large increase in the shipment of El Capitan ore to this country is expected during that period. The sales of this ore, both in Europe and in the United States, exclusively are in the hands of Philadelphia ore merchants.

The imports of Swedish iron ore in 1914, aggregated approximately 290,000 tons, which went exclusively to the Bethlehem Steel Co. and to the Reading Iron Co. under long term arrangements in effect for several years. The year's deliveries to these companies, however, were considerably less than the tonnage specified in the contracts for 1914. No Swedish ore was sold in the open market during the year. Shipments of this ore during November and December dropped off sharply and only one or two cargoes were received.

Spanish ore shipments to eastern furnaces in 1913 approximated 60,000 tons and were the smallest for a number of years. This falling off is in line with the decreased interest which eastern furnaces have been showing in this mineral in recent years, or since the high tide of this movement was reached in 1910, when 439,868 tons were imported. In 1911, the imports were 194,965 tons, in 1912, 92,061, and in 1913, 112,580 tons. The Spanish ore shipped to eastern consumers in the year consisted chiefly of Sagmenera, a bessemer hematite and Marbella and Lucainena, the latter low phosphorus minerals. One cargo of Bedar ore, a bessemer soft hematite from Spain, analyzing about 60 per cent in iron, was delivered in the year.

War Checks Wabana Shipments

Wabana, Newfoundland, ore figured less extensively in the mixtures of eastern furnaces in 1914 than at any time since it was introduced to the market in this country. The deliveries of this ore were almost 38,000 tons, as compared with 213,468 tons in 1913, 145,355 tons in 1912, 174,853 tons in 1911 and 209,006 tons in 1910. The shipments in the year represented only such unfilled portions of contracts as were carried over from sales made in 1913. Not a single new purchase of this ore was made in the year, although in the latter part there were some offers of cargoes from mineral in stock at the mines. The outbreak of the European war resulted in the shutting down of the mines of the Nova Scotia Steel & Coal Co., which has been shipping important quantities of this ore both to Germany and to England. About 120,000 tons of this ore which was under contract for Germany, was nullified. Since the beginning of the war, several cargoes of ore have been shipped to England, but the mines have remained idle. The shutting off by the war of a large part of its European market, especially in Germany, has seriously affected the export position of the Nova Scotia company.

Venezuelan ore ceased to be of any importance in the eastern market during the year and shipments from that source were only 2,400 tons. In 1913, they were 59,000 tons. The dropping out of this ore was due to the deterioration in quality of the Imataca ore and the abandonment of the development of these deposits along the Orinoco river by the Canadian-Venezuelan Ore Co., Ltd., which had shown considerable vigor in this enterprise during the preceding year. As a result of the decline in the iron content of the ore, a contract for 500,000 tons to be delivered in 100,000 tons annual installments to the Alan Wood Iron & Steel Co., which was entered into in 1913, has been cancelled. The present outlook for the Imataca properties is very uncertain, as the Canadian-Venezuelan Ore Co. is in financial difficulties. A single cargo of this ore, which was brought in early in the year and was rejected by the original consignee, was forced on the market and sold at a sacrifice or at 5½ cents per unit, at tidewater.

CUBAN ORE SHIPMENTS IN RECENT YEARS.

	Total.	South coast.	North coast.
1914.....	850,000*	580,000*	270,000*
1913.....	1,582,431	1,090,718	491,713
1912.....	1,397,797	951,621	446,176
1911.....	1,163,714	775,922	387,792
1910.....	1,462,498	1,154,798	307,700
1909.....	936,132	936,132	.....
1908.....	620,836	620,836	.....
1907.....	650,174	650,174	.....
1906.....	640,574	640,574	.....
1905.....	561,159	561,159	.....
1904.....	387,273	387,273	.....
1903.....	623,527	623,527	.....

*Estimated.

Canada furnished but a single cargo of ore to the eastern Pennsylvania market. This totalled 4,350 tons, and was from Bathurst, New Brunswick, representing a part of contracts carried over from 1913, only a small portion of which however, was delivered. In that year, the deliveries of this ore aggregated 72,260 tons. There were no sales of New Brunswick ore in the year, although it was offered in the market. Other Canadian deliveries to the United States in 1914, totalled about 70,000 tons, these coming in principally to New York state and Ohio furnaces. From Moose Mountain 26,089 tons were shipped to the states.

Chilean Ore Developments

The Bethlehem Steel Co. in 1914, initiated shipments from the extensive deposits at Tofo, near the coast and about 30 miles north of Coquimbo, Chile, of which it acquired control in 1913 and is proceeding to develop.

Operations have proceeded steadily at these mines during the year. The handicap due to the general disturbance caused by the European war to a great extent has been neutralized by the abundance of labor now available in Chile, because of the closing of many nitrate operations. Exploration work by means of tunnels has been carried on, and ore reserves have been materially increased. Much ore also has been disclosed in some cuts made in road construction. Tunnels now are in ore at a point 150 meters, or 490 feet, below the top of South Hill. It was thought that this ore from the lower part of the ore-body might show some increase in sulphur content, but this has not been the case. A sample from the lowest tunnel analyzed as follows: Iron, 67.47 per cent; manganese 0.12; phosphorus, 0.008; sulphur trace; silica, 2.00. Some exploration tunnels in the mantle of float ore on the eastern edge of the deposit materially have increased the tonnage of such ore in sight.

Methods of Handling

Shipments of ore have continued during the year as conditions permitted. The ore shipped has been transported to Cruz Grande by aerial tramway and loaded into vessel by a cantilever loading bridge. This cantilever now has been fitted with a conveying belt 36 inches wide replacing the buckets as installed by the French company which formerly operated the mines. It is expected that this will reduce greatly the loading time and correspondingly expedite shipments. During the year, there have been shipped to Philadelphia six cargoes aggregating 42,000 tons, and to Europe three cargoes aggregating 21,000 tons, making a total of 63,000 tons.

The ore consigned to Europe was to fill contracts entered into by the French company. Three of the cargoes consigned to the United States came through the Panama canal, the Oldfield Grange being the first boat to use the waterway for this purpose.

A typical cargo analysis (natural) of the ore is as follows, the cargo selected being that of the steamship "Twickenham": Iron, 67.60; moisture, 0.10; phosphorus, 0.043; silica, 2.21; copper, 0.009.

It now is hoped to ship 200,000 tons in 1915, and gradually to increase this amount till the permanent installation is completed, when a production of 1,500,000 or 2,000,000 tons annually will be provided.

A very important feature of the year was the development of a water supply. In 1913, water rights were acquired of the San Juan group of copper mines at La Higuera, and an abundant source of water has been developed. A contract has been let to the Snare & Triest Co. of New York, for installing a basin dock in the Bay of Cruz Grande. The basin will be excavated approximately 40 feet deep, 200 feet wide and 900 feet long. The basin is in the form of a slip, where the boats can enter for the loading of iron ore. At one side of the basin will be erected a steel dock 340 feet long. This dock will have pockets which will hold 30,000 tons of ore. This can be loaded by chutes into the boats. The dock will be similar in construction to many docks now in service on the Great Lakes. The railroad tracks on top of the dock are at an elevation of 123 feet above low tidewater. The railroad from the mines, which will be a single-track, standard-gage line, will approach this dock from a higher elevation, and will not require any upgrade hauling of the ore.

The main line of this railroad will be about 15 miles long. Of this, 13 miles will be of a uniform three per cent grade, the remaining two miles varying from level track to a two per cent grade. The mine has an elevation of about 2,300 feet above the sea level, and is on a direct line about four miles from the dock at the Bay of Cruz Grande.

The railroad will be electrically operated, having a catenary overhead trolley system which will furnish direct current at 2,400 volts to 110-ton electric locomotives. These locomotives will be able to haul a train of twenty-one ore cars, of 420 tons total weight, up to the three per cent grade in continuous service. The most interesting feature of the electric locomotives is the regeneration of power when they are descending the grade with loaded trains. The power thus generated will be sent back into the lines to assist in hauling the empty cars up the grade.

At the Bay of Cruz Grande, a modern steam turbine electric power plant will be built. The General Electric Co. has the contract for the installation of this plant, as well as for the electrification of the railroad. The present plant will consist of two steam turbines of 3,500 kilowatt capacity each. The present boiler equipment will consist of four boilers of 440 horsepower each. Oil will be used for fuel, although the boilers will be constructed so that coal can be used, if desirable. A 300-kilowatt alternating current turbine will be used to provide power for the station auxiliaries, and to supply power for the load at night. Power will be transmitted to the mine from the power house by a 22,000 volt transmission system, which will consist of two duplicate transmission lines on the same poles. Power will be furnished the railroad by two motor generator sets with a capacity of 1,000 kilowatt normal load.

Little progress has been made in providing facilities in New York harbor which will be the point for the receiving and unloading of the ore in this country.

The Lehigh Valley railroad awarded preliminary contracts for the construction at Communipaw, N. J., of a large ore pier and unloading dock, though this work has not yet been started. In the year, the Bethlehem Steel Co. effected a contract with Swedish shipping interests, whereby it is to charter five steel steamships of 17,000 tons capacity each, to be built by the latter especially to carry Chilean ore between Coquimbo and New York or Philadelphia, through the Panama canal. These charters are to cover a period of 10 to 20 years and are reported to have been closed at a fixed freight rate of 11s 6d, or about $2.80, per gross ton. The vessels are to be ready to enter this traffic within two years of the date of the contract. It has been computed that on the assumption the Chilean ore permanently will average 62 per cent in iron, the shipping contract insures the Bethlehem Steel Co. a long-term base of rich ore supply at an approximate cost of not over 7¾ cents per unit of iron, delivered at South Bethlehem.

Some offers of cargo lots of Brazilian ore were made in the eastern market in the year without success owing to trade conditions. This ore is reported to analyze 65 per cent in metallic iron. An English syndicate now is putting some energy into the development of some of the rich deposits which Brazil is known to embrace within its borders.

FOREIGN IRON IMPORTS IN RECENT YEARS

	1910.	1911.	1912.	1913.	1914.
Cuba	1,462,498	1,163,714	1,397,797	1,582,431	850,000
Sweden	259,911	219,238	333,863	356,074	290,000
Spain	439,868	194,965	92,061	112,580	60,000
Newfoundland	209,006	174,853	145,355	213,468	38,000
Canada	95,005	50,480	106,675	179,860	75,000
French Africa	15,471	4,443	.....	12,950	46,000
Chile	.....	.....	.....	.....	45,000
Miscellaneous	120,674	19,874	31,019	84,216	15,000
Total	2,591,031	1,811,732	2,104,576	2,594,770	1,419,000

In 1914, the miscellaneous shipments included 2,400 tons from Venezuela and odd lots from Germany, France, England and Scotland.

The Port Henry Regions

Mining and shipping operations in the Port Henry district in New York state in 1914 reflected the reduced activities of eastern blast furnaces. The output of crude ore at Mineville and vicinity, which constitutes the Port Henry district, was approximately 650,000 tons, some of which went into stock, as against about 1,000,000 tons in 1913. Shipments of crude and concentrated ore by Witherbee, Sherman & Co., the Port Henry Iron Ore Co. and the Cheever Iron Ore Co., were about 400,000 tons. The demand by furnaces for crude and high phosphorus ores from the Port Henry district was small, causing some mines to be operated very lightly. There was, however, a very fair market for higher grade ores and concentrates which were used by the furnaces, in connection with cheaper and lower grade mineral. Prices commanded by Port Henry furnace ores in 1914, averaged from 6½ to 7¾ cents per unit of iron delivered in eastern Pennsylvania. The Barton Hill mine and mill of Witherbee, Sherman & Co. was idle owing to the small market for Bessemer concentrates which is the product of this property.. The Cheever mine was active for several months during the year and moved a moderate

tonnage. At the present time, this property is idle.

The absence of any considerable market for ore, limited the amount of new construction and development work initiated or completed during the year. In June, the concentrating mills Nos. 1 and 2 of Witherbee, Sherman & Co., at Mineville, were destroyed by fire. At the present time, a large modern mill of fireproof construction is being erected to replace the destroyed units. This mill will handle Old Bed ores and will have a capacity of about 1,500 tons of crude ore daily, or practically equal to the combined capacity of the two former units. The new mill will be completed early in 1915. Witherbee, Sherman & Co. and the Port Henry Iron Ore Co. have been going ahead with some underground development work and magnetic surveys to extend old and to define new deposits. Nothing but the barest prospecting work was done in the year on the Ausable holdings of Witherbee, Sherman & Co., in Clinton county, N. Y., a few miles west of Port Kent, where this operator holds a vast body of magnetite ore for future development.

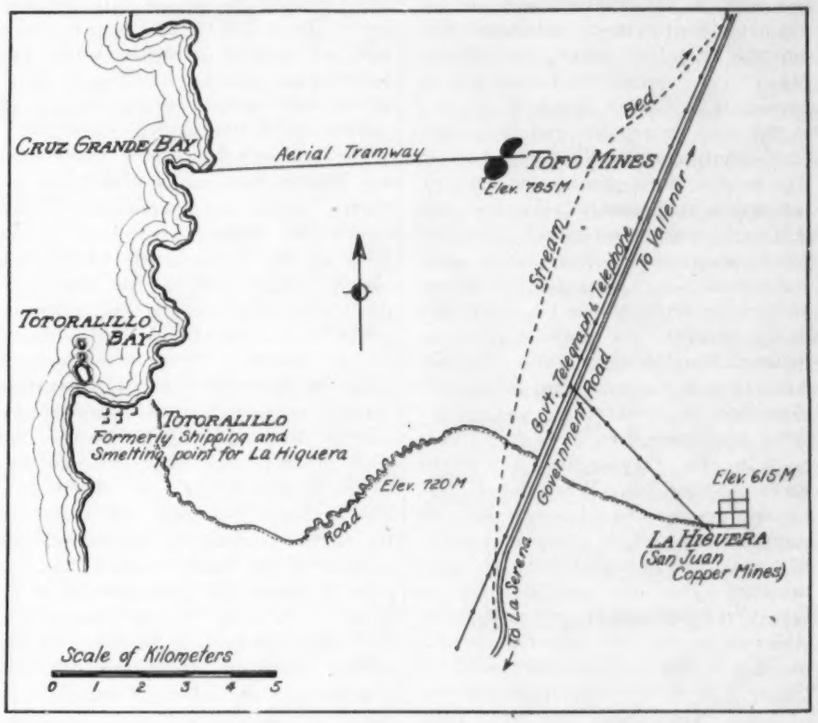
The condition of both the financial and the iron market during the year has prevented any progress being made in the plans previously announced by Witherbee, Sherman & Co., to build a modern ore dock at Port Henry, which is joined with the eventual purpose to erect a modern blast furnace plant on New York tidewater as an outlet for Port Henry ores. Both the ore dock and blast furnace projects now are held in abeyance and action in these directions probably will be delayed pending the completion of the enlarged Champlain canal, connecting Port Henry with the Hudson river at Troy, which now is promised for 1916. Witherbee, Sherman & Co. still have control over a tract of land on tidewater at Sewaren, N. J., on the inner metropolitan harbor, as the site for the proposed furnaces.

The Essex & Clinton Ore Co., Inc., of 100 Broadway, New York, has been conducting exploration work in the Bullwagga Mountain district on the west shore of Lake Champlain near Crown Point, N. Y. These properties have been known of in the ore trade for some years, but never have been thoroughly exploited, it is said. The presence of a considerable body of ore has been shown by the work so far conducted. Two definite varieties of ore have been found, one the characteristic black magnetite of the region and of Mineville and the other black and white ore which resembles the titaniferous Lake Sanford ore of the McIntyre Iron Co., in Essex county. Assays of surface ores of the black magnetite class, taken from the main lenses, show 59 per cent iron content. Assays of ore from the numerous side veins run from 44 to 50 per cent in iron. The ores are pronounced to be free from sulphur, phosphorus and titanium. Exploration at the foot of the mountain, 1,100 feet down, indicates a better quality of mineral at lower depths. No plans for development work of this property yet have been perfected owing to prevailing business conditions, but it is believed that the opening of the barge canal to Lake Champlain will bring about some progress in the commercial utilization of these deposits.

The McIntyre Iron Co., which mined a fixed tonnage of titaniferous iron ores from its properties in the Lake Sanford district in Essex county and conducted trial smelting tests with this mineral in the Port Henry blast furnace, has done nothing further to exploit these deposits. Further activity in this direction is dependent upon the return of better business conditions.

At Lyon Mountain, N. Y., the Chateaugay Ore & Iron Co. has continued to carry out its plans for the sinking of unusually deep shafts to open lower ore bodies which extensive diamond drilling has indicated are of large size within the tested area. The Lyon Mountain ore bed is noted for its size and chemical purity. The present concentrates carry from 50 to 62 per cent metallic iron, a trace of sulphur and from 0.006 to 0.009 phosphorus. This ore is used in the Standish, N. Y., furnace of the Northern Iron Co. for the production of standard low phosphorus iron.

Some of the local New Jersey and New York state mines were able to run at a fair rate of operations during the year, but this condition was the exception rather than the rule, owing to the contracted demand from the furnaces. Some properties were idle, while others operated only part capacity. Those producing the higher grade mineral were able to place their output fairly well, as furnace managers sought such material as would cheapen their mixtures and shopped about rather vigorously. Local ores sold in the eastern market during 1914 at the range of 6½ to 7½ cents per unit, delivered eastern Pennsylvania, depending upon the quality and the points of delivery. Plans for the improvement and modernizing of many of these local mines which have been in view for several years, were not actively advanced in the year, owing to the absence of any stimulating demand from the market. Some of these projects, however, have continued to go forward and in a few cases have been completed. The enlargement and re-equipping of the plant of the Mount Hope, N. J., mine of the Empire Steel & Iron Co., was completed. The concentrating mill has been rebuilt and a new system of mining has been adopted. This property now has a shipping capacity of about 20,000 tons monthly.



MAP SHOWING LOCATION OF TOFO MINES

Important extensions continue to be carried forward at the Peters, N. J., mine of the Ringwood Co., which, when perfected, will give the property a capacity of about 2,000 tons daily. This will make the Peters mine the largest domestic operation in New York or New Jersey, outside of the Port Henry district. The company is installing magnetic concentrating capacity and other extensions to its mining and shipping plant to bring about the increased production. These improvements will not be completed for some months. The Pequest Iron Co. has completed at Buttzville, N. J., concentrating and nodulizing capacity, but its operations await upon a more active condition of the ore market. The Sterling Ore & Railroad Co., Sterlington, N. Y., operated on an increased scale as the result of improvements completed during the preceding year. The Benson Mines Co. carried on concentrating operations at Benson Mines, N. Y., and in the year shipped its product to eastern Pennsylvania and other districts. The project for re-opening the old Croton mines at Croton, N. Y., has been delayed by market conditions. The Fort Montgomery Iron Corporation was formed with a capital of $500,000 to succeed the Hudson Iron Co., which has been operating the Forest of Dean mines at Fort Montgomery, N. Y. The business will be conducted along the same lines as previously.

An important new development was made by the Thomas Iron Co. in its Richard mine at Wharton, N. J., through the opening of a new body of magnetite ore rich in iron and containing considerable vanadium and some titanium. This new ore body now is being exploited and it has added considerably to the ore resources of the company. The company has been following a policy of using magnetite ores of lower New Jersey and New York, together with hematite ores of eastern Pennsylvania. The latter mineral has been drawn from small operations, particularly in Lehigh county, which it was thought had been worked out a generation ago.

Company is Busy.—The Spicer Mfg. Co., Plainfield, N. J., a few days ago entertained its superintendents and foremen by a dinner and theater party in New York, to celebrate an improvement in business conditions. The company, which manufactures drop forgings and universal joints for automobiles, has resumed running six days a week, owing to the booking of large orders, and the officers of the company say as far as they can see now the change in the schedule will be permanent.

Government Bulletin on Electric Furnaces

In connection with its investigation looking to the prevention of waste and the increase of safety and efficiency in the mineral industry, the bureau of mines, department of the interior, has undertaken a study of the possible uses of the electric furnace in metallurgy. The results of this investigation are embodied in a bulletin recently issued by the bureau which contains a wealth of information regarding the construction and operation of electric furnaces. The bulletin which consists of 216 6 x 9-inch pages is divided into three parts. The first part, by Dorsey A. Lyon and J. F. Cullen, covers the design, construction and operation of electric furnaces; the second part, by Dorsey A. Lyon and R. M. Keeney, deals with the smelting of metals in the electric furnace; and the third part, by R. M. Keeney, covers the manufacture of ferro-alloys in the electric furnace.

The following conclusions taken from the bulletin, covering the field of the electric furnace are interesting: "In the combustion furnace, no matter what form of fuel is used, the temperature cannot exceed 2,000 degrees Cent. In the combustion furnace, the efficiency varies from 2 to 60 per cent, whereas in the electric furnaces it averages about 60 per cent. In the combustion furnace, not only is it necessary to take care of the products of combustion, but these products may reduce the efficiency of the process, whereas the electric furnace is free from these difficulties. In the electric furnace, the temperature obtainable is the same whether the furnace is operated on a commercial or on a laboratory scale. In the electric furnace, the heat may be developed at any desired point, and by passing the current through the substance that is to be treated the heat necessary for the operation may be developed within the substance itself. The temperature of an electric furnace is under absolute control. Any atmosphere desired, that is neutral, oxidizing or reducing, may be obtained within the electric furnace. This feature, together with the fact that the product is generally much purer than that of the combustion furnace, is a great factor in favor of the electric furnace.

"In general, one may say that it is necessary to use an electric furnace in all operations requiring a temperature higher than 2,000 degrees Cent.; for all work requiring a temperature less than 2,000 degrees Cent., local conditions and the nature of the work to be done will affect the choice of the electric or the combustion furnace. The cost of power will largely enter into the matter, but even with a high cost of electric power, the superior efficiency of the electric furnace, the possibility of obtaining a purer product, and perhaps greater safety for the workmen—any or all of these factors may lead to a decision in favor of the electric furnace."

War Material

Adds Largely to Tonnage on Books of Canadian Plants

Toronto, Jan. 12.—J. H. Plummer, president of the Dominion Steel Corporation, states that though the company has received a large number of orders from abroad, contracts have to be taken at prices which leave only small profits. The company is making such changes in its plant as are required in connection with the new markets now being opened up.

A new structural mill will be erected for the manufacture of small material, which it is hoped will be in operation by March 1. Twelve new machines for wire-making are being installed so that heavy orders for wire from England may be filled as speedily as possible. Three blast furnaces are in operation and a fourth will be blown in about the middle of the month.

The steel plant of the Nova Scotia Steel & Coal Co., at Sydney Mines, will shortly be working to capacity owing to heavy orders from abroad. The open-hearth furnaces were started about a month ago after being closed for nearly four months and preparations are being made for the opening of the blast furnaces and other departments. Raw steel will be manufactured at this plant and shipped to New Glasgow to be worked up into the finished product.

An additional order for approximately 1,000,000 shrapnel shells to be manufactured in Canada has been received from the British government. This brings the total number of shells to be made in Canada up to about 1,800,000, the value of the business being estimated at between $22,000,000 and $23,000,000. The order will be widely distributed among a large number of plants.

J. W. Leonard, assistant to the president of the Canadian Pacific Railway, has resigned his position to become superintendent of the Toronto Terminal Co., capitalized at $18,000,000, to provide stations and terminal facilities for the Canadian Pacific and Grand Trunk Railways at Toronto.

Grant Hall has been appointed vice president and general manager of lines west of Port Arthur of the Canadian Pacific Railway, with headquarters at Winnipeg, in place of George Bury, elected vice president with headquarters at Montreal.

Problems of Capital and Labor

Famous Danbury Hatters' Case Decided in Favor of the Boycotted Employer—Mr. Drew Explains the Clayton Law

Washington, Jan. 12.—Affirmation by the Supreme Court last week of decisions of lower courts holding that individual members of a labor union may be held responsible for triple damages in a civil action brought under the Sherman law has again turned attention to the power of the courts under the Clayton anti-trust act.

The Supreme Court, by unanimous vote, sustained the district court and the court of appeals in the famous Danbury hatters' case—Loewe vs. Lawlor—which held members of the United Hatters' Union liable for triple damages, representing $252,000, for a boycott instituted against Loefe & Co., hat makers of Danbury, Conn. It was the second time the Supreme Court dealt with litigation arising from that case. The first time it held that a labor organization, through the use of the boycott, may be guilty of conspiracy in restraint of trade under the Sherman law.

The Supreme Court's last decision was rendered through Mr. Justice Holmes. It was prosecuted under the Sherman anti-trust law, charging a combination in restraint of trade. It is understood that the plaintiffs will be able to collect the damages assessed against individual members of the hatters' union because their bank accounts and properties have been attached. Samuel Gompers, president of the American Federation of Labor, with which the union is affiliated, has indicated that its members will make a hard fight against payment of the demages. Originally there were 191 members of the union against whom action was brought, but it is said that of this number 10 or 11 have died since the case was instituted.

It was contended by members of the union that they could not be held responsible for the acts of its officers. The action of the Supreme Court is, therefore, held to throw around employers a strong guard against the pernicious boycott as practiced by the hatters' union. In addition to Judge Davenport, the plaintiffs were represented by Attorney James M. Beck, while the union was represented by Judge Alton B. Parker and Attorney Frank L. Milholland.

Fixing the responsibility for the conspiracy, which he said had been clearly proven, Justice Holmes said:

"It is a tax on credulity to ask any one to believe that members of labor unions at that time did not know that the primary and secondary boycott and the use of the 'We don't patronize' or 'Unfair' list were expected to be employed in the effort to unionize shops. Very possibly they were thought to be lawful."

The decision points out that the union members, if they did not know what was done in this specific case, were bound to know the constitution of their societies, and at least feel they might be bound to know how the words of those constitutions had been construed in the act. The union's constitution, it was stated, provides for the use of "all means in their power" "to bring shops" "not under our jurisdiction" "into the trade." It further provides for a separate fund for strikes, lockouts and for agitation for the union label.

"It requires more than the blindness of justice," the decision says, "not to see that many branches of the United Hatters and the Federation of Labor, to both of which the defendants belonged, in pursuance of a plan emanating from headquarters, made use of such lists, and the primary and secondary boycott in their effort to subdue the plaintiffs to their demands. The union label was used and a strike of the plaintiff's employes was ordered and carried out to the same end."

The Supreme Court adds that it agrees with the Circuit of appeals that a combination and conspiracy forbidden by the statute were proved and that the questioned is narrowed down to the responsibility of the defendants for what was done by the sanction and procurement of the societies above named.

It is pointed out that the court in substance instructed the jury that, if these members paid their dues and continued to delegate authority to their officers unlawfully to interfere with the plaintiffs' interstate commerce in such circumstances, they knew or ought to have known and such officers were warranted in the belief that they were acting in the matter within their delegated authority, then such members were jointly liable and no others.

"It seems to us," the decision adds, "that this instruction sufficiently guarded the defendants' rights and that the defendants got all they were entitled to ask in not being held chargeable with knowledge of law."

Will Have Decided Effect

D. E. Loewe, of the firm of D. E. Loewe & Co., hatters, Danbury, Conn., who carried the famous case through all the courts after having suffered severely from a boycott, writes The Iron Trade Review *as follows:*

Editor, The Iron Trade Review:

Your kind favor of Jan. 6, congratulating us upon the decision of the Supreme Court in our case against the members of the United Hatters of North America, is received, for which please accept our thanks.

Our senior attorney, Hon. Daniel Davenport, has analyzed the Clayton bill and he claims that this bill does not in any way change the anti-trust law in its relation to labor.

Unless future legislation will undo what has been done so far, this decision will have a decided effect, namely in making unions and their officers more careful about violating the law.

D. E. Loewe.

Danbury, Conn., Jan. 9, 1915.

Mr. Drew's Opinion

Walter Drew, counsel of the National Erector's Association, was asked by the editor of The Iron Trade Review to comment upon the decision in the hatters' case with special reference to what effect the new Clayton law would have upon the rights and remedies of the parties under circumstances similar to those in that case. Mr. Drew writes as follows:

There seems a great deal of needless misconception as to the terms and effect of this law, which is entirely unjustified if reference be had to the explicit terms and plain meaning of the law itself.

It may be positively stated, as a general proposition, that nothing in the Clayton law would have prevented or affected in any way the institution of the proceedings in the hatters' case, the prosecution of that case to final judgment, or the legal rules and principles upon which the different decisions and judgments in the case were based. Had the Clayton law been in effect, the plaintiff would have had precisely the same rights and remedies. More than that, the

Problems of Capital and Labor

Officers of Chicago Labor Unions Indicted on Evidence Presented by Shippers of Machinery—Other Indictments Expected

Clayton act affords the right to injunctive relief in addition to the other remedies which existed before its passage. It is hard to believe that Mr. Gompers and other labor leaders, with their corps of able lawyers, have any real misconception as to the meaning of the law. It were easier to believe that in heralding this law as labor's "magna charta" of rights, they are making a virtue out of necessity in order to lead their followers and the general public to believe that the law constitutes a real victory due to the political influence of organized labor.

In the first place, the Clayton law is a law "to supplement existing laws against unlawful restraints and monopolies and for other purposes". It does not repeal the anti-trust act, but merely supplements it. The paragraph of the anti-trust act upon which the hatters' case was based and which by the decision of the Supreme Court makes a boycott which affects interstate commerce an unlawful conspiracy, still remains in full force and effect, neither affected nor modified by any provision in the supplementary Clayton law.

The section of the Clayton law supposed to contain the most important provisions of labor's new "magna charta" is Section 6. In substance, it provides that human labor is not a commodity or article of commerce; that the anti-trust laws shall not be construed to forbid the existence of labor organizations, or to restrain their members "from lawfully carrying out the legitimate objects thereof"; and that such organizations shall not be held to be "illegal combinations or conspiracies in restraint of trade under the anti-trust laws". But no court has ever held that human labor is an article of interstate commerce or that the fixing of the price of labor by unions was unlawful under the anti-trust act. No prosecution to hold a labor union under the anti-trust act as an unlawful conspiracy because it restrained competition among its members in the fixing of wages has ever been instituted or even suggested. Neither has any prosecution ever been instituted or suggested based upon the theory that a labor union as such was an illegal combination under the anti-trust act. When, however, the officers and members of a union depart from its "legitimate" purposes and enter upon a concerted effort to destroy the trade of individuals engaged in interstate commerce by a national boycott, the courts have held such conduct to be a restraint of commerce within the meaning of the anti-trust law, and the persons engaged in such conduct to be members of an unlawful conspiracy. They may be members of such a conspiracy even if not members of the union. It is their participation in the conspiracy that is unlawful, not their membership in the union, which is merely incidental.

It is at once clear that section 6 merely states principles of law which were already in existence and recognized by our courts, and that it confers no immunity upon the members of a union who "unlawfully" invade the rights of others by forming a conspiracy to interfere with or restrain interstate commerce through the use of the boycott.

Section 20, also part of labor's "magna charta", deals with the issuance of injunctions in labor disputes and specifies certain limitations as to the issuing of injunctions to prohibit certain enumerated acts. Here, however, as in section 6, it is only lawful acts which are exempted from prohibition by injunction. Picketing is not legalized, for the section exempts only "peaceably assembling in a lawful manner and for lawful purposes." Boycotting is not legalized, for the section exempts from injunctive prohibition only "withholding their patronage from any party to such dispute, or from recommending, advising or persuading others by peaceful and lawful means so to do". This language as to picketing and boycotting merely states the law as it previously existed, and gives no immunity whatever to the coercive and intimidating picket line or to the secondary boycott. Intimidation, coercion, malicious injury, the sympathetic strike and the boycott are all the subjects of injunctive relief now to the extent and in the same measure as before the passage of the act, and if they effect a restraint upon interstate commerce, come under the prohibition of the anti-trust laws just as completely now as they did when the hatters case was instituted.

When that case was instituted, there was open to the complainant, so far as any remedy based upon violation of the anti-trust law was concerned, only one remedy, that of a suit in damages. Criminal prosecution could be begun by the proper prosecuting officers of the federal government, and it was also provided that the United States district attorneys, under the direction of the attorney general, could institute proceedings in equity to prevent and restrain violations of the act. The private citizen who was injured by such violation, however, had no right to the remedy of injunction. The Clayton law, however, provides "that any person, firm, corporation or association shall be entitled to sue for and have injunctive relief in any court of the United States having jurisdiction over the parties against threatened loss or damage by a violation of the anti-trust laws, including sections 2, 6 and 7 of this act, when and under the same conditions and principles as injunctive relief against threatened conduct that will cause loss or damage is granted by courts of equity". The Clayton law, therefore, confers a remedy upon the private citizen which he did not before possess. Had the Clayton act been in effect when the hatters' case was instituted, Mr. Loewe, upon the refusal of the attorney general's department to enjoin the continuation of the boycott against him, could have proceeded in a court of equity himself for immediate injunctive relief without the necessity of waiting the slow proceedings of a suit for damages in order to secure a vindication of his rights.

Without going further into the specific provisions of the Clayton law, it may be said in summary that it does not make lawful any conduct of a labor union or any other combination that was previously unlawful. Our American courts have long placed labor unions upon the same basis as other combinations of citizens, applying to them the same principles and standards of conduct. No decision can be pointed out which makes any conduct on the part of a labor union unlawful which would not be unlawful on the part of any other combination of persons. For years Mr. Compers and his associates have tried to secure legislation which would exempt unions from the rules and principles which governed other combinations. It is doubtful if such legislation could be framed which would be constitutional. It is certain that the Clayton law does not confer any such exemption. It is possibly better from Mr. Gomper's point of view to assume to believe that it does than to admit the failure of his long and strenuous political campaign in that behalf.

Labor Leaders Indicted

Chicago, Jan. 12.—After long investigation and a careful hearing of the evidence presented by shippers of machinery the United States grand jury has returned to Judge Carpenter in the United States district court an indictment charging conspiracy to obstruct interstate commerce and actual obstruction of interstate commerce. The indictment names the following:

Michael J. Artery, 2828 Flournoy street; secretary and business agent of the Machinery Riggers' and Safe Movers' Union, Local No. 136.

Charles W. Fry, 3703 Bosworth avenue; business agent of Machinists' Union No. 126 and head of the machinery unions' district council.

Michael Galvin, 40 North Fifth avenue; secretary and former business agent of the Truck Teamsters' Union, Local No. 705, and a business agent of the teamsters' district council.

The incident on which the present indictment rests relates to a shipment of refrigerating machinery by the York Mfg. Co., York, Pa., to the Knickerbocker Ice Co. of Chicago. Artery, representing the Machinery Riggers' and

Safe Movers' Union, is said to have approached F. W. Pilsbry, western manager of the York company, with a demand for $1,500, which he claimed would equal the difference between Chicago union wages and the non-union wages at the York plant. On refusal by Mr. Pilsbry to pay this demand, Artery is said to have gone to John S. Field, president of the Knickerbocker Co. On Mr. Field's refusal, Artery notified him that the material would remain on the cars.

Mr. Field then decided to move the machinery by having the truck drivers handle it. Artery then enlisted the assistance of Galvin, business agent of the Truck Teamsters' Union, and another obstacle was made. Mr. Field then attempted to unload the machinery by using his own men, but Fry, business agent of the Machinists' Union, stopped machinists on the work at the Knickerbocker company's structure. The three then are said to have notified Mr. Field that unless he "kicked in," all work would be stopped.

Mr. Field testified before the grand jury that he finally paid $900 and all his difficulties were removed immediately.

The indictment makes no mention of the money taken by the three men and extortion is considered only as a detail. The fact is set out at considerable length that the machinery was moved over three separate roads, common carriers, in interstate commerce.

It alleges that the car containing this machinery was detained and that men employed to unload were prevented from doing so by the three defendants.

The possible penalty under the law is five years' imprisonment and a fine of $10,000 on each count, according to United States District Attorney Clyne. There are four counts in this indictment. The specific acts which caused restraint of trade are declared in one count, which is characteristic, to be as follows:

"The grand jurors also present that the defendants prevented the delivery of the said ice machinery, which was in interstate commerce, by causing said ice machinery to remain on said car and in failing to permit it to be delivered in that when unloading of the said ice machinery would be attempted, the said defendants attempted and did prevent said unloading by threats to call a strike of all trades then engaged in constructing the new building of the Knickerbocker Ice Co. at Sixty-third and Lexington avenue."

President Simon O'Donnell of the Chicago Building Trades Council expresses satisfaction at the indictment, as his organization dropped the machinists' union from affiliation about one year ago for failure to carry out an agreement with the Building Construction Employers' Association. Mr. O'Donnell congratulates himself that his organization took action which is substantiated by the grand jury act of yesterday.

At least 13 other cases of similar extortion and interferences with interstate commerce have been presented to the grand jury and numerous other indictments are expected to follow when the grand jury reconvenes after a two weeks recess.

Important Question Settled

By John Kirby Jr.,

Formerly President National Association of Manufacturers.

The great majority of the people of this country have given a passing thought to the recent decision of the supreme court, in the Danbury Hatters' case, which for eleven years had been wending its way toward that tribunal. But comparatively few people realize the great significance of this decision, or what it means to the future of this nation.

The question of whether a labor union had the right to destroy a man's business unless he obeyed its commands has now been definitely settled in the negative. Had the supreme court ruled otherwise, every individual and corporate business concern, as well as every individual member of society, would be subject to the tyrannical dictation of organized labor in the pursuit of daily vocations. Labor organizations would then have become immune from conspiracy laws to which all other classes of citizens are and would still be amenable.

Those who have been following this litigation, hopeful of the ultimate success of the plaintiff in the case, have had faith that the court of last resort would sustain the lower courts and set its stamp of condemnation on such a preposterous and unholy thing, which if permitted to exist under the protection of law, would mean the beginning of the end of American liberty.

Doubt has been expressed, in some quarters, as to whether, in view of the passage of the Clayton bill, further prosecutions of this character would be possible, but a careful analysis of the Clayton law does not reveal anything to justify the doubt, or even to warrant the belief that congress has provided the means whereby one class of citizens may ride rough shod over all other classes and be immune from punishment therefor. The Clayton bill, as originally introduced, provided for that very thing, but its teeth were drawn, under pressure.

J. Kirby Jr.

Dayton, O.,
Jan. 7, 1915.

Dies From Battle Wounds

Jean Solacroup, a brilliant young steel master of France, who was well known to a number of steel makers in the United States, has given up his life in the defense of his country, according to advices just received by friends in New York City. Monsieur Solacroup entered the service Aug. 1, as a sub-lieutenant. For gallant service at the front, he was promoted to captain within a month and was decorated with the Legion of Honor. He was wounded in battle Sept. 4 and died on Sept. 10. Monsieur Solacroup was connected with the Cie. Des Forges & Acieries de la Marine et d'Homecourt of Paris, which has had considerable business relations with certain American Steel companies. He frequently had visited in this country and was highly regarded for his technical ability and for his personal qualities by all steel men with whom he came in contact.

The Pennsylvania Railroad Co. is paying the tuition fee of 40 young men who are taking mechanical courses at the Trenton School of Industrial Art, Trenton, N. J. The courses are for four years and the young men are paid full wages for the time they are off. All are employed at the Pennsy car shops at Trenton.

Business News from the Capital

Supreme Court Sustains Ohio Workman's Compensation Law—Agitation for Tariff Commission—New Order in Advance Rate Case

Washington, Jan. 12.—Much interest was manifested in manufacturing and labor circles in the decision last week of the Supreme Court of the United States which, affirming the supreme court of Ohio, held that the Ohio workmen's compensation law is constitutional.

The constitutionality of the act was brought into question because of the fact that manufacturing companies, employing five or more, who do not take advantage of its provisions, and the plaintiff in error, the Jeffrey Mfg. Co., Columbus, O., did not, are deprived in negligence cases of certain defenses otherwise available, viz., (1) negligence of fellow-servants, (2) assumed risk, and (3) contributory negligence. It was contended by counsel for the plaintiff in error that the act contravenes the provisions of section 1, fourteenth amendment to the constitution of the United States in that the classification of employers and employes is arbitrary and unreasonable.

The Supreme Court's decision, which was unanimous, and rendered through Mr. Justice Day, passing on this point, says:

"This is said to result from the fact that in denying the defenses the industries are classified by the number of employes,—those employing four or less are still privileged to make either or all of these defenses, while if the employer has five or more employes, and has not paid into the state insurance fund the premiums provided by the act, he is deprived of the benefit of such defenses.

"The fact that the negligence of a fellow servant is more likely to be a cause for injury in the large establishments, employing many in their service, and that assumed risk may be different in such establishments than in smaller ones, is conceded in argument, and, is, we think, so obvious, that the state legislature cannot be deemed guilty of arbitrary classification in making one rule for large and another for small establishments as to these defenses."

Taking up the question of alleged discrimination against employers who fail to come into the plan and who employ five or more men, the decision declares:

"No employer is obliged to go into this plan. He may stay out of it altogether, if he will. Not opening the door of the statute to those employing less than five, still leaving them to the obligations and rules of the common and existing statute law, the legislature may have believed that, having regard to local conditions, of which they must be presumed to have better knowledge than we can have, such regulation covered practically the whole field which needed it and embraced all the establishments of the state of any size, and that those so small as to employ only four or less might be regarded as a negligible quantity and need not be assessed to make up the guaranty fund or covered by the methods of compensation which are provided by this legislation. This is not a statute which simply declares that the defense of contributory negligence shall be available to employers having less than five workmen, and unavailable to employers with five or more in their service. This provision is part of a general plan to raise funds to pay death and injury losses by assessing those establishments which employ five or more persons and which voluntarily take advantage of the law.

"We are not prepared to say that this act of the legislature, in bringing within its terms all establishments having five or more employes, including the deprivation of the defense of contributory negligence where such establishments neglect to take the benefit of the law, and leaving the employers of less than five out of the act, was classification of that arbitrary and unreasonable nature which justifies a court in declaring this legislation unconstitutional.

"It follows that the judgment of the supreme court of Ohio is affirmed."

Ore Rate Hearing

Washington, Jan. 12.—Apparently both sides to the Lake Superior ore rate controversy, which came to an end before the interstate commerce commission last Wednesday, when oral arguments were made, are satisfied with points they made. Independent ore shippers are fighting the rate of 60 cents per ton from mines to docks, while it was vigorously defended by the carriers. The case is one of the most important of the kind ever submitted to the commission, and was instituted in February, 1912.

Attorney Richard Jones Jr., representing independent steel companies of the Mahoning and Shenango valleys of Ohio and Pennsylvania, respectively, made the principal argument for the shippers. The chief argument for the railroads was made by Attorney Frank B. Kellogg, representing the Duluth & Iron Range and the Duluth, Missabe & Northern railroads. The closing argument was made by Attorney George Wilson for the Jones & Laughlin Steel Co., who followed Attorney E. C. Lindley for the Great Northern railroad.

Shippers insist the rate should not exceed 40 cents per ton, and claim profits from the 60-cent rate are excessive. Railroads uphold the 60-cent rate and claim that the larger earnings to which shippers referred were made when the rate was 80 cents. Attorney Jones denied that the shippers had accepted the valuations of railroads as made by the attorneys for the latter. Instead, he said, that, as an instance, the shippers hold that the Iron Range's actual value is only $17,000,000, and not $33,000,000 as claimed by Mr. Kellogg. The latter said the figures he gave are accurate and are based on those given to the Minnesota railroad commission.

It was urged that for the service rendered, its character, fluctuations in the ore traffic, its limited seasons and such matters justified the 60-cent rate. Mr. Jones took occasion to attack the claim of Mr. Lindley that, because the steel industry is demoralized, the ore tonnage will be reduced and the present rate should therefore be maintained. It was contended by Mr. Jones that it was unfair to base revenues on a single lean year. Moreover, he said, the steel production last November was about 40 per cent of the capacity, while new contracts have increased the production to about 80 per cent. At the same time, it was stated, prices of steel commodities remain low and will continue so for some months to come.

Again Suspended

Washington, Jan. 12.—The interstate commerce commission has further suspended from Jan. 13 until July 13 operation of tariffs containing new regulations and charges for carrying slag, ashes and other refuse material from steel plants in Pennsylvania, Ohio and West Virginia. In its order of suspension the commission points out that the hearing cannot be concluded by Jan. 13 and further suspension was necessary. The tariffs would mean a greatly added transportation tax to steel interests, who are strongly opposed to the new charges and regulations.

Business News from the Capital

Congressman Whitacre Favors Tariff Commission—Results of the Five Per Cent Advance Rate Case—Department of Commerce Issues New Publication

Washington, Jan. 12.—The order entered last Friday by the interstate commerce commission in the 5 per cent advance rate case makes workable its original and supplemental decisions without destroying the percentage system of making rates in official classification territory. The carriers are thus enabled to retain the groupings and relationships, a thing which would have been impossible had no increases beyond or below 5 per cent been permitted. It is believed that the rates exceeding and less than that amount will about equalize one another, resulting in a net increase of virtually 5 per cent. Some are inclined to think, however, that the order will result in complaint by shippers whose rates have been increased more than 5 per cent, while others think the view will be taken that the plan is equitable and could not be satisfactorily worked out in any other manner, and, moreover, that the sums involved will be comparatively small and will not justify complaint.

Iron and steel rate computations are carried in detail in the order and denote that the effect on those rates will be practically the same as was the case with central freight association rates on iron and steel articles following the original decision. The new rates are to become operative upon 10 days' notice to the commission by filing of the tariffs. A great number will go into effect Jan. 15, and all of them are expected to be operative by March 1 at the latest.

Issues New Paper

Washington, Jan. 12.—The department of commerce a few days ago launched its new publication *The Daily Commercial Report*. It is really a revision of *The Daily Consular and Trade Reports*. Because of the flood of cablegrams and daily reports from consuls on conditions growing out of the war it was found impossible to carry them in *The Daily Consular and Trade Reports* along with the regular mail correspondence and annual reports. It was therefore decided to issue in supplements much of the mail correspondence and annual reports, so that space may be given to the pressing daily reports in order to supply them to the business interests of the country as soon as possible. The name of the paper was changed to make the designation more appropriate. The new paper will carry all important commercial cablegrams received from attaches at the various embassies abroad and from consuls. It will be supplied to those who received *The Daily Consular and Trade Reports* and to others upon application, accompanied with the subscription price.

Branch offices of the bureau are located in New York, Chicago, Boston, St. Louis, Seattle, San Francisco, Atlanta and New Orleans.

Favors Tariff Commission

Washington, Jan. 12.—Congressman Whitacre, Democrat, of Ohio, does not agree with a statement recently credited to Judge Gary, chairman of the United States Steel Corporation, that the depression in the iron and steel business is due to the Underwood-Simons tariff law. It is the opinion of Mr. Whitacre, whose home is in Canton, that the iron and steel industry sagged because of the railroads' failure to purchase supplies.

This is the view he has taken in connection with his efforts to have passed his bill creating a tariff commission. The measure is similar to one recently introduced in the house by Minority Leader Mann. Mr. Whitacre thinks that the iron and steel representatives should appear before the ways and means committee of the house, if they think the present tariff has injured their business, and show the quantities and nature of goods which have been imported from abroad since the new law became effective. Apparently he thinks the iron and steel importations have been comparatively slight, and that, therefore, the steel schedule is justified, although this point, it is certain, would be a matter of controversy if steel representatives appeared before the committee. Even though they agreed importations have been relatively small, it is pointed out, they could logically say that in order to prevent further increased importations it was necessary to reduce domestic prices. The present low prices of iron and steel commodities, it is claimed, would well justify such a contention.

Mr. Whitacre recently had a meeting with the Ohio delegation in congress and it was the opinion of the delegation that Mr. Whitacre should appear before the ways and means committee, and, in justificating the creation of a tariff commission, point out what he thinks are the defects of the existing tariff law and the needs of its revision. It is Mr. Whitacre's belief that the present tariff law is justified on the whole, but that in some parts it requires revision. To arrive at a scientific, satisfactory and non-partisan tariff, it is his idea that a commission should be created.

Investigation by the department of commerce of the pottery industry, which is such an important enterprise in Mr. Whitacre's district, convinced him that the present tariff covering that business is satisfactory.

Kentucky Included

Washington, Jan. 12.—The interstate commerce commission has entered an order including points in Kentucky in the general investigation of ore rates from lower lake ports. Originally the investigation covered points in Pennsylvania, Ohio and West Virginia.

Cleveland Steel Co. Resumes

After a shut-down of two months, during which time extensive alterations and improvements were made, the plant of the Cleveland Steel Co., Cleveland, is about to resume full operation in all departments. Among the other improvements a new engine was installed. Arrangements are also being made to electrify certain portions of the plant. The Cleveland Steel Co. rolls sheets and plates No. 12 gage and heavier. Special sheets for deep drawing and stamping also are manufactured.

Prizes for a Name

Joseph T. Ryerson & Son are offering $325 in prizes for a suitable name for the complete line of tool steel which they are manufacturing. The first prize of $100 in gold will be given to the one who submits the winning name. In the event of a tie, this sum will be divided equally among those submitting the name chosen. To those who send in the 100 next best names, new reference books of steel and engineering data in loose leaf leather binders will be given. For the next best 200 names submitted, bound volumes of the same book will be awarded. The names of those submitting the best 101 names, will be placed on the contest roll of honor, which will be published in Ryerson's monthly journal and in trade papers. The contest will close April 15 at noon.

January Will Prove Best Month

In More Than a Year at Present Rate of Activity—Equipment Demand for Vocational Schools Features Eastern Market—Machine Tool Exports Holding Well

War Cancelled Orders Offered in United States

Before the war the Tropenas Converter Co., 50 Church St., New York, placed orders with the Chemnitzer Werkzeukmaschinenfabrik vorm. J. Zimmermann, for two gear cutting machines. Orders also were placed with Wagner & Co. Werkzeukmaschinenfabrik of Dortmund for a combination planer and milling machine. These machines cannot be delivered on account of the war and the Tropenas Converter Co. would like to communicate with American manufacturers for the purpose of placing orders for similar machines in this country. The specifications of the gear cutting machines are as follows: One electrically driven (without motor) spur, helical, spiral and spherical gear cutting machine to cut gears up to 1,100 millimeters diameter and face up to 300 millimeters; pitch down to 13. One electrically driven (without motor) bevel gear cutting machine, cutting at one time the two faces of one tooth, cut gears up to 500 millimeters diameter and up to 150 millimeters face; pitch down to 15. The specifications of the combination planer and milling machine are as follows: One electrically driven (without motor) planer and milling machine equipped with four planing heads and one milling head. Length to be planed 12,300 millimeters; width to be planed 3,550 millimeters; height to be planed 3,550 millimeters; and width of table to be no less than 3,100 millimeters.

Hugh Girvan, 120 Cannon street, London, who formerly represented several large Belgian manufacturers of steel, wishes to form permanent agency connections with American producers of billets, sheet bars, wire rods and other semi-finished material, also with manufacturers of wire products, structural shapes, sheets, cold rolled strip steel, bolts, nuts, spikes, merchant pipe, cast iron pipe, etc.

THE FIRST two weeks of the new year have been characterized by some interesting developments in the eastern machine tool market. A large number of inquiries have come out, thus greatly increasing the amount of business pending, and a large total of business has been placed. If the present rate of activity keeps up for the next two weeks, January will be the best month in more than a year. The largest buying was done by the Remington Arms Co., Ilion, N. Y., and the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn. These concerns together placed orders for several hundred machine tools, and have not yet closed for all their requirements. The Pratt & Whitney Co., Hartford, Conn., which has bought the old plant of the Pope Mfg. Co., in Hartford, has closed for a large quantity of machinery and still is in the market. Another very large buyer was the Nova Scotia Steel & Coal Co., New Glasgow, N. S., which has placed orders for a complete equipment for making shrapnel. The Washington Steel & Ordnance Co., Washington, D. C., has bought much equipment for making shrapnel. This company also has let a contract to the Westinghouse Electric & Mfg. Co., Pittsburgh, for the manufacture of shrapnel parts. A feature of the market is the demand for equipment for vocational schools. The school board at York, Pa., opened bids on Jan. 5 on a list, and the school board at Orange, N. J., opened bids on Jan. 11 on a similar list. The equipment recently inquired for by the school boards of New York City and Jersey City, N. J., has not yet been closed. There has been some fair business recently in cranes. The Morgan Engineering Co., Alliance, O., took a 150-ton crane for the Midvale Steel Co., Philadelphia, and a 150-ton, short-span, gantry crane for the Argentine government. The Victor Talking Machine Co., Camden, N. J., is in the market for a 20-ton power house crane; the E. W. Bliss Co., Brooklyn, N. Y., for a 20-ton crane, 80-foot span; the M. W. Kellogg Co., Jersey City, N. J., for a 3-ton crane. Some other larger cranes also are being figured on. The Fore River Ship Building Co., Quincy, Mass., bought a 10-ton, 101-foot span, Shaw crane, and the United Illuminating Co., New Haven, Conn., a 20-ton Shaw crane. The United States Cast Iron Pipe & Foundry Co., Burlington, N. J., is in the market for six core hoists, two 5-ton, two 3-ton and two 2-ton capacity. The Cincinnati, Hamilton & Dayton railroad has placed a driving wheel lathe. Robert Wetherill & Co., Chester, Pa., have placed an order for a large double-end punch. The Newport News Ship Building & Dry Dock Co., Newport News, Va., is reported to be preparing a list of machine tools. The International High Speed Steel Co., 478 Pearl street, New York, is buying the equipment for a tool steel rolling mill to be erected immediately in Rockaway, N. J.

The demand for American machine tools for export is still large and there are many export inquiries out. Such an inquiry is that put out by Austin, Baldwin & Co., 116 Broad street, for a large number of machine tools. Most of the foreign demand comes from England and, in a smaller degree, from France. There also is a lively demand from Spain and Italy. One house has received orders for nearly 200 machine tools during the past week for the two latter countries. A difficulty which is proving a serious obstacle in transacting this foreign business is the attitude of the steamship companies. Not alone are the freight and insurance rates exorbitantly high, but some steamship lines now are refusing absolutely to receive machine tools for export even to neutral countries. There is a feeling in the trade that this situation should be remedied in some way, since this country never had a better opportunity to develop foreign markets and it indeed would be unfortunate if the lack of transportation facilities should continue to give trouble.

Machine tool dealers in Chicago find no essential change since the new year and a number express their

AYER & LORD
INTERIOR
Always Easy on the Feet
WOOD BLOCKS

Delays Prove Costly!

You would not for a single moment encourage loafing or carelessness in your shop,would you?

Neither would you for a single moment permit the setting of danger traps or the digging of pitfalls.

BUT—don't you realize that the ordinany flooring, no matter how carefully laid, soon deteriorates into a beautiful combination of snares, pitfalls and danger traps, proving more costly to you in the long run than almost any amount of the forbidden loafing and carelessness?

Uneven floors mean *delays* and *accidents—LOTS OF THEM!*

Then investigate at once *AYER & LORD INTERIOR WOOD BLOCKS*—the trouble-proof flooring—*no delays—no expenses—no accidents!*

Write for our free booklet "FLOORS".

Ayer & Lord Tie Company

General Offices, Railway Exchange, Chicago

CLEVELAND, O.—801 Swetland Bldg.
KANSAS CITY, MO.—1117 Rialto Bldg.
MEMPHIS, TENN.—1402 Exchange Bldg.
PHILADELPHIA, PA.—319 Perry Bldg.

The illustration above shows an installation of *Ayer & Lord Interior Wood Blocks* in the plant of *The Parish-Bingham Co., Cleveland*.

This room is now filled with heavy stamping machinery. Automobile frames are fabricated on the floor, hot rivets being used. This flooring has to undergo excessive heavy trucking and hauling—all sizes of automobile trucks heavily laden being continually in motion.

Note the even and true surface of the floor, and the low reflection of light.

experience as being fully as bad as the final weeks of 1914. Expected buying on the part of railroads has not developed and other lines of manufacture have not come forward to relieve the situation. The only railroad buying known in the west is an order by the Northern Pacific Railway Co. for some tools to equip a locomotive repair shop at St. Paul. The North-Western is said to have a list in preparation which will be put out in a short time. Interest in export business continues to grow. A Holland engineering company is inquiring for presses and other machinery for the manufacture of hammers, boiler makers' tools, picks, shovels, spades, hoes, forks, etc., together with wood-working machinery for making tool handles. A Buenos Aires firm which has been very successful in obtaining government contracts for water, sewer and gas service, wants cast iron valves, cement and sewer pipe. A South African importer wishes to establish an agency for cutlery and all lines of metal novelties. A Sydney, Australia, machinery importer is in the market for foot valves and strainers. A firm of engineers at Melbourne, Australia, wishes to make agency arrangements with an American manufacturer of electrical apparatus. These are not inquiries looking to a single purchase or order. It is stated that the parties all desire to open permanent accounts with manufacturers in the United States. Further details relating to these inquiries may be obtained from R. L. Ardrey, 234 S. La Salle street, Chicago.

In Cincinnati, the new year has opened with machine tool manufacturers even more busy, and with prospects for good business during the first six months much better than was the case at the beginning of 1914. Makers of lathes and metal boring machinery are operating full time because of orders received from Europe, and several good orders for planers have also been received by local shops. These contracts will keep a number of plants in this city busy until well into the second quarter of the year. Orders from Europe also continue to come in. The R. K. Le Blond Machine Tool Co. has received another order for about 200 lathes for foreign delivery, and the Cincinnati Iron & Steel Co. has secured four large contracts for lathes from the same vicinity in Italy. Domestic business shows a little improvement, but is still dull in comparison with European trade.

EASTERN STATES

LAWRENCE, MASS.—Plant of Smith Machine Co., Essex street, was badly damaged by fire. Flames also wiped out the pattern shop of R. W. Walker, located in the same building.

NORFOLK DOWNS, MASS.—Plant of Boston Gear Works was slightly damaged by an explosion.

WHITINSVILLE, MASS.—Whitin Machine Works is building a foundry addition, 50 x 200 feet, which will increase foundry capacity by 50 per cent; the company announces that, due to slack business conditions, the plant will not be completely finished at this time.

BRIDGEPORT, CONN.—Standard Mfg. Co. has let the contract for a three-story, brick and steel addition to its plant on Housatonic avenue, to H. E. Green.

BRIDGEPORT, CONN. — Kendall, Taylor & Co., Boston, architects, have let contract for a three-story and basement, 80 x 120-foot addition, to be built here for the Royal Equipment Co.

BRIDGEPORT, CONN. — Locomobile Co., which recently figured as a buyer of considerable new machinery, has leased additional space in the Bridgeport Engineering Co.'s building.

HARTFORD, CONN.—Billings & Spencer Co. plans to make repairs and improvements, to cost approximately $100,000, at the old Columbia Motor Vehicle Co.'s plant, which it recently purchased; in addition to the remodelling of buildings, one or two cranes of approximately 20 tons capacity each will be installed and a new boiler house will be erected.

NEW HAVEN, CONN.—Winchester Repeating Arms Co. has bought the buildings and property of the Imperial Sewing Machine Co., in order further to increase its manufacturing space; the Winchester company, as recently noted in The Iron Trade Review, also is erecting several additions to its plant.

BINGHAMTON, N. Y.—Lewis M. Farrington, assistant secretary of the state hospital commission, Albany, will take bids until Jan. 21 for a new boiler, stack, etc., for the Binghamton state hospital.

BROOKLYN.—E. W. Bliss Co. is in the market for a 20-ton traveling crane, 80-foot span.

BROOKLYN. — Chas. Shirrmeister, 3100 Ocean Parkway, plans to build a two-story, 25 x 100-foot building which will be rented for manufacturing purposes.

BROOKLYN.—Architect G. P. Tubby, 81 Fulton street, New York, will take bids shortly on a four-story addition for the Chelsea Fibre Co., Manhattan avenue and Commercial street, Brooklyn.

BUFFALO.—H. L. Morlock, 206 Babcock avenue, will build a one-story, 31 x 57-foot factory building at 994 Seneca street.

BUFFALO.—Lockwood, Greene & Co., 60 Federal street, Boston, are completing plans for three-story and basement, 65 x 125-foot plant for the Buffalo Meter Co.

DOBBS FERRY, N. Y.—Arthur Young has the general contract for a one-story garage and machine shop to be erected for G. T. Griggin.

LONG ISLAND CITY, N. Y.—Brett Lithographing Co., Manhattan, has acquired a site and will erect four-story concrete and brick building.

NEW YORK.—Atlas Typewriter Co. has been incorporated; $100,000 capital stock; by C. W. Rathjens, L. C. Steffens, H. Roher, 276 West Eleventh street.

NEW YORK.—Universal Safety Brake Co. has been incorporated; $25,000 capital stock; by R. and L. M. Bernfeld, S. Wiesenberg, 341 Crimmins avenue.

NEW YORK.—Magnus Co., manufacturer of iron and copper, has been incorporated; $3,000,000 capital stock; by Herbert B. Ogden, 165 Broadway, et al.

NEW YORK.—Hoevel Sandblast Machine Co. has been incorporated; $10,000 capital stock; by H. E. Hoevel, 50 Church street, Manhattan; D. W. DeMotte, B. M. Schwarzlow.

NEW YORK.—Mexican Petroleum Co., represented by Frederick R. Kellogg, of this city, has preliminary plans under way for an oil refining plant of reinforced concrete construction to be erected at Mariner's Harbor, Staten Island, at a cost of about $1,500,000; it is expected operations will be started by June, and a site selected by Feb. 1.

ROCHESTER, N. Y.—Eisler Mfg. Co. has let the contract for erection of a 48 x 110-foot machine shop.

ALLENTOWN, PA.—This city, Jos. A. Schmidt, clerk, contemplates the erection of a two-story machine shop.

LACOLLE, PA.—Keystone Excavating & Grading Machinery Co., Johnstown, Pa., will move its plant here; a site has been purchased and ground will be broken about April 1 for the proposed plant; works will be equipped with a steam power plant.

LANSDALE, PA.—Frank Weaver has let contract for construction of one-story, 40 x 60-foot forge shop to E. J. Reiff Co., 1033 Race street, Philadelphia.

LANSFORD, PA.—Lehigh Coal & Navigation Co.'s No. 6 boiler house was badly damaged by fire.

PHILADELPHIA.—Hunter Horse Shoe Co. has been incorporated; $25,000 capital stock; by Edward A. Smith.

PHILADELPHIA.—United Roofing & Mfg. Co., Morris building, is planning to build a one-story, 67 x 73-foot plant, at Marcus Hook, Pa.

PHILADELPHIA.—Edward M. Harris, 50 North Twenty-third street, has let the contract for a one-story and basement, 61 x 118-foot factory at 209 North Twenty-second street.

PHILADELPHIA.—Architects Heacock & Hokonson are about to let contracts for a one and two-story power plant, 111 x 176 feet, to be erected for Jos. R. Grundy Co., Bristol, Pa.

PHILADELPHIA. — Peuckert & Wunder have completed plans for a two-story, 38 x 80-foot, steel and brick power plant on East Third street, for the Norris Market Ice Mfg. & Cold Storage Co.

SOUTH BETHLEHEM, PA. — The chief engineer of maintenance of way of the Lehigh and New England railroad is receiving bids on revised plans for a one-story, 163 x 264-foot building to be erected at Pen Argyle, Pa., for use as a locomotive shop and storehouse.

ALLENHURST, N. J.—Jos. B. Rider, 29 Broadway, New York, is drawing plans for an electric lighting plant to be erected here.

BOONTON, N. J.—It is likely a new set of boilers will be purchased shortly for the New Jersey Firemen's Home here.

BURLINGTON, N. J.—United States Cast Iron Pipe & Foundry Co. is taking bids on two 5-ton, two 3-ton and two 2-ton core hoists.

CAMDEN, N. J.—The Victor Talking Machine Co. is in the market for a 20-ton crane and other power house equipment.

DOVER, N. J.—The board of trade has received applications from manufacturers wishing to establish a tool steel and forging plant and a chemical factory in Dover.

JERSEY CITY, N. J.—M. W. Kellogg Co. is in the market for a three-ton electric traveling crane.

MAPLEWOOD, N. J. — Architect Edw.

Krug, 1170 Broadway, New York, has let general contract for one-story garage and machine shop to be erected for this city to Deffur, Koehler Co., Irvington, N. J.

NEWARK, N. J.—J. L. Summer Mfg. Co. has let a contract for the erection of an addition.

CENTRAL STATES

BARBERTON, O.—Engineer Alcorn has submitted a report on the proposed viaduct over the railroads, canal and river, and for the elimination of grade crossings on Huston street, Robinson and Tuscarawas avenues; report is on file at the city hall.

CINCINNATI.—Report of the special committee on subways and rapid transit has been submitted to the council; it provides for a rapid transit belt line passenger terminal and freight stations and will involve an outlay, including equipment, of $12,250,000; W. T. Edwards, engineer especially employed by the city, made the report.

CLEVELAND.—Gutman Tractor Co., manufacturer, has been incorporated; $10,000 capital stock; by E. K. Hoy, L. M. Menges, B. A. Shatto, M. J. Kurka, G. D. Eshelman.

CLEVELAND.—George F. Paul, contractor, will break ground today, at 4400 Perkins avenue, for a one-story, 100 x 135-foot factory addition for the Metals Welding Co.

CLEVELAND.—Hydraulic Press Brick Co., of this city, is spending $50,000 in improving its plant at Ironspot, O.; new kilns are being added and new equipment installed; work will be completed in the spring.

CLEVELAND.—Fire, starting in the one-story, frame lead foundry of the Willard Storage Battery Co., Lakeside and Marquette avenues, did about $75,000 damage to the plant, according to an estimate by W. B. Pettibone, general manager; three gasoline motors that furnished power to the five buildings of the plant were badly damaged.

EAST PALESTINE, O.—McGraw Tire & Rubber Co. has increased its capital from $1,000,000 to $1,500,000.

LIMA, O.—William Glover has purchased property at the corner of North and Union streets, and will start the construction of a seven-story business block early in the spring.

LIMA, O.—George and William Bayly have decided definitely on the erection of an eight-story, brick and stone hotel at the corner of High and Union streets.

MILLERSBURG, O.—Helmuth Slate & Steel Co. has increased its capital from $25,000 to $75,000.

PORTSMOUTH, O. — Portsmouth Street Railway & Light Co. has called for payment, Jan. 1, for $50,000 first mortgage bonds and has sold a new issue of $500,000; the proceeds will be used to extend the lines of the company 22 miles from Sciotoville to Portsmouth, and to make other improvements.

TOLEDO, O.—City council has authorized a bond issue of $45,000 and has instructed the city engineer to prepare plans for paving the Fassett street bridge with wood blocks.

WHEELING, W. VA.—Bids will be received at the United States Engineer's office until 11 a. m., Jan. 30 for furnishig and erecting steel lock gates for Ohio river dam, No. 15.

WESTERN STATES

KEARNEY, NEB.—It is reported the city clerk will receive bids until Jan. 25 for the construction of a steel arch bridge, 46-foot span.

HARDIN, MONT.—Security Bridge Co., Minneapolis, was awarded the contract for completing the water system here at $26,466.

COEUR d'ALENE, IDA. — Libby Paper Mill Co., Libby, Mont., has been notified by the chamber of commerce that the people of Coeur d'Alene will subscribe for $50,000 in stock if given representation on the board of directors; it is presumed this insures the construction of the plant to Coeur d'Alene.

Business Logic

Daniel Webster defines logic as the science of exact reasoning. Now see if this isn't logic: —A real, genuine business tip means hope; hope means life; life means activity, and ACTIVITY ALWAYS MEANS BUSINESS.

We supply the tips—
YOU apply the logic.

The board of public library and Hill reference library of St. Paul, are taking steps towards the erection of two libraries to cost about $1,000,000.

International High Speed Tool Co., 478 Pearl street, New York City, has let the contract for a 100 x 250-*foot building, it proposes to erect at Rockaway, N. J., to the McClintic-Marshall Co., Pittsburgh, and will be in the market shortly for rolls and other equipment.*

Zimmerman Steel Co., Lone Tree, Ia., capitalized at $300,000, *will move to Davenport, Ia., next spring. Plans call for the erection of shop buildings, installation of cupolas, bessemer converters, etc. The company manufactures stump pullers, wagon scales and does a business in gray iron and steel castings.*

The board of county commissioners, Chehalis, Wash., will receive bids until Feb. 3 for the construction of three steel bridges and one steel trestle.

Victor Talking Machine Co., Camden, N. J., is in the market for a 20-ton crane and power plant equipment.

Felker Mfg. Co., Marshfield, Wis., will begin work about March 1 on a 75 x 80-*foot addition for the manufacture of steel stanchions, feed trucks, etc. A considerable list of equipment will be purchased.*

United States Cast Iron Pipe & Foundry Co., Burlington, N. J., is taking bids on two 5-ton, two 3-ton and two 2-ton core hoists.

Allentown, Pa., Joseph A. Schmidt, clerk, contemplates the erection of a two-story machine shop.

Joseph B. Rider, 29 Broadway, New York City, is drawing plans for an electric lighting plant to be erected at Allenhurst, N. J.

Ohio Corrugating Co., recently incorporated at $50,000, *to handle sheet mill products largely, will start the erection of a plant within 60 days at Warren, O.*

Supervising Architect O. Wenderoth, of the treasury department, Washington, D. C., will receive bids about March 1, on an $800,000 *central power plant for the United States argicultural building.*

CHEHALIS, WASH.—County commissioners will receive bids until Feb. 3, for three steel bridges and one steel trestle.

CLARKSTON, WASH.—Council has granted a franchise to A. G. Nortz and associates, permitting the construction and operation of an electric railway from the Lewiston-Clarkston bridge through the streets of the city; work is to start shortly; bids are being received for electrical equipment to cost $15,000; estimated amount to be expended in the valley approximate $750,000.

PORT ANGELES, WASH.—It is reported the Goodyear Timber Co. will construct a large sawmill at this place and that work will start shortly on the railroad to extend from the company's timber lands to its mill on Callam Bay.

RENTON, WASH.—S. G. Combs, Seattle, has the construction contract for a glass studio, to cost about $150,000, for the Puget Sound Film Producing Co., Warner H. Milner, architect, Seattle, has completed the plans, which include light and heating plants.

SEATTLE.—It is reported the proposed government Alaska railroad will extend from Sheep Creek to the Matanuska coal fields and that later extensions will be constructed south from Portage or Seward and north to Fairbanks.

SEATTLE.—An architect is to be selected soon by Manning & Morris, state representatives of the Denby Motor Truck Co., to prepare plans for a $60,000, four-story, reinforced concrete garage and salesroom at Eleventh avenue and East Pine street.

SEATTLE.—Port commission will receive bids until Jan. 28 for seven-story, reinforced concrete and tile warehouse; bidders are invited to sublet alternate bids on plans of their own; certified check for 5 per cent of bid required.

WALLA WALLA, WASH.—Brown-Lewis Co. has purchased a site upon which a plant will be erected for the manufacture of harvesting machinery.

DALLAS, ORE.—Polk county has included $70,000 in its 1915 budget to meet its portion of the cost of constructing a bridge over the Willamette, between Polk and Marion counties; entire cost of bridge will be about $210,000.

PORTLAND, ORE.—American Tin Can Co., this city, has awarded a contract to the American Dredge & Construction Co., Seattle, for a $50,000 dredge to be installed in the Alaska tin fields this summer.

PORTLAND, ORE.—Valley & Siletz Railroad Co. is preparing to construct 10 miles of railroad in the spring; R. L. Donald, manager, Northwestern Bank building, Portland.

ROSEBURG, ORE.—It is presumed work will start in the spring on the proposed railroad between Roseburg and Coos Bay; Roseburg voted $500,000 in bonds last fall, which probably will be sufficient for 15 miles.

PASADENA, CAL. — Pasadena Electric Welding Co. has been incorporated; $250,000 capital stock; by Hugo Thornblade, W. A. Glench, S. F. McRae.

SACRAMENTO, CAL.—Hercules Portable Unloading Co., car-unloading devices, has been incorporated; $40,000 capital stock; by L. R. Miller, H. G. Waterman, and Hans Graber, Sacramento; Etta E. and G. E. Bowers, San Francisco.

SAN FRANCISCO.—John G. Rapp, local representative of the Seattle Brewing & Malting Co., reports a branch brewery will be established in San Francisco; Louis Hemrich, president.

SAN FRANCISCO.—Dry Refrigeration Co., refrigeration apparatus, has been incorporated; $1,000,000 capital stock; by W. M. Rank, J. E. Drendel, W. D. O'Brien, M. S. Game, G. H. Mastick, et al.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to April 1.)

Bessemer, valley	$13.75
Bessemer, Pittsburgh	14.70
Basic, Pittsburgh	13.45
Basic, eastern Pa.	13.50
Malleable, Pittsburgh	13.70 to 13.95
Malleable foundry, Chicago	13.00 to 13.50
Malleable foundry, Philadelphia	14.50 to 15.00
Malleable foundry, Buffalo	13.00 to 13.25
No. 1X, Philadelphia	14.50 to 14.75
No. 2 foundry, Pittsburgh	13.70 to 13.95
No. 2 foundry, valley	13.00 to 13.50
No. 2 foundry, Cleveland	13.25
No. 2 foundry, Ironton	12.75
No. 2 foundry, Chicago	13.00 to 13.50
No. 2X foundry, Philadelphia	14.25 to 14.50
No. 2X fdy., N. J. tidewater	14.25 to 14.70
No. 2X foundry, Buffalo	13.00 to 13.25
No. 2 plain, Philadelphia	14.00 to 14.25
No. 2 plain, N. J. tidewater	14.00 to 14.25
No. 2 plain, Buffalo	12.75 to 13.00
No. 2 southern, Birmingham	9.50 to 9.75
No. 2 southern, Cincinnati	12.40
No. 2 southern, Chicago	13.75 to 14.00
No. 2 southern, Phila. delivery	14.50
No. 2 southern, Cleveland	13.50 to 13.75
No. 2 south'n, New York, docks	13.50 to 14.00
No. 2 southern Boston, docks	13.75 to 14.25
No. 2 south'n, interior New Eng.	15.00 to 16.00
No. 2 southern, St. Louis	14.00 to 14.25
Virginia No. 2X furnace	12.50 to 12.75
Virginia 2X, Philadelphia	15.25 to 15.50
Virginia 2X, Jersey City	15.50 to 15.75
Virginia 2X, Boston points	15.75 to 16.00
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.45 to 13.70
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Cleveland	17.63
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	19.00 to 20.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7c
Foreign non-Bess., 50 to 65 per cent	7c

COKE

(At the ovens)

Connellsville furnace	$1.60 to 1.75
Connellsville fur. contr.	1.70 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy., contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-manganese, Baltimore	$68.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open-hearth billets, Phila.	$21.40 to 21.90
Forging billets, Phila.	24.40 to 25.40
Forging billets, Pbgh.	24.00 to 24.50

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.30
From Pittsburgh	.46
From Youngstown	.48
From Niles	.48
From Wheeling	.46
From Steubenville	.46
From Johnstown	.445
From Coatesville	.39
From Steelton	.40
From Bethlehem	.375
From Cleveland	.49
From Chicago	.60

Wire rods, Pittsburgh	$25.00
Billets, Pittsburgh	19.50 to 20.50
Billets, Youngstown	18.50 to 19.50
Sheet bars, Pittsburgh	20.00 to 21.00
Sheet bars, Youngstown	19.00 to 20.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs., Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pbgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh. base.	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.85
New England	2.85
Philadelphia	2.65
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.20
New England (all rail)	2.45
New York and Brooklyn (all rail)	2.45
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York docks (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.10c
Structural shapes, Chicago	1.29c
Structural shapes, Philadelphia	1.25c to 1.30c
Structural shapes, New York	1.26c to 1.31c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.29c
Tank plates, Pittsburgh	1.10c
Tank plates, Philadelphia	1.25c to 1.30c
Tank plates, New York	1.26c to 1.31c
Bars, soft steel, Pittsburgh	1.10c
Bars, soft steel, Chicago	1.29c
Bars, soft steel, Philadelphia	1.25c to 1.30c
Bars, soft steel, New York	1.26c to 1.31c
Hoops, carloads, Pittsburgh	1.25c
Hoops, less carloads, Pittsburgh	1.30c
Bands, Pittsburgh	1.10c
Shafting, carloads, Pbgh., disc. contract	66 to 67
Shafting, less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	0.975 to 1.025c
Bar iron, Philadelphia	1.12c to 1.19c
Bar iron, New York	1.10c to 1.15c
Bar iron, Cleveland	1.15c
Bar iron, Pittsburgh	1.15c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c
No. 28, black, Chicago	1.99c to 2.09c
No. 28, tin mill, black, Pbgh.	1.85c
No. 28, galvanized, Pbgh.	2.75c to 2.80c
No. 28, galvanized, Chgo.	2.89c to 2.99c
No. 10, blue, annealed, Pbgh.	1.30c to 1.35c
No. 10, blue, annealed, Phila.	1.45c to 1.50c
Tin plate, 100 lb., coke base	$3.10 to 3.20

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll., and re-anl.	30 cents
Hot roll'd, pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller levelling	10 cents
Patent levelling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open-hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	81	72½
Iron, ¾ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	80	71½

BOILER TUBES

Steel, 3½ to 4½ inches	74
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.50 to 1.55
Wire nails, retailers, Pittsburgh	1.55 to 1.60
Plain wire, jobbers, Pittsburgh	1.30 to 1.35
Plain wire retailers, Pittsburgh	1.35 to 1.40
Galvanized wire, jobbers, Pbgh.	1.70 to 1.75
Galvanized wire, retailers, Pbgh.	1.75 to 1.80
Polished staples, Pbgh.	1.50 to 1.55
Galvanized staples, Pbgh.	1.90 to 1.95
Barb wire, painted, jobbers, Pbgh.	1.50 to 1.55
Barb wire, painted, retailers, Pbgh.	1.55 to 1.60
Barb wire, galv., retailers, Pbgh.	1.95 to 2.00
Barb wire, galv., jobbers, Pbgh.	1.90 to 1.95

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads 80 and 15; larger or longer, 75 to 15.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅜ inch and larger, $7.20; ⅛-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh	1.45c to 1.50c
Structural rivets, Chgo	1.68c
Boiler rivets, Pbgh	1.55c to 1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length	
1½ inch and wider	Hard.	Soft.
0.100 and thicker	2.85	3.10
0.050 to 0.099 inc	2.95	3.20
0.035 to 0.049 inc	3.10	3.35
0.031 to 0.034 inc	3.35	3.75
0.025 to 0.030 inc	3.60	4.00
0.020 to 0.024 inc	3.80	4.20
0.017 to 0.019 inc	4.70	5.20
0.015 and 0.016	5.10	5.60
0.013 and 0.014	5.95	6.45
0.012	6.55	7.05
0.011	6.90	7.40
0.010	7.25	7.75
	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc	2.80	3.05
0.035 to 0.049 inc	2.95	3.20
0.031 to 0.034 inc	3.10	3.50
0.025 to 0.030 inc	3.20	3.60
0.020 to 0.024 inc	3.30	3.70
0.017 to 0.019 inc	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON PIPE

Three to 20 in., Cleveland	$21.50
Twenty-four to 48-in., Cleveland	21.00
Four-inch, Chicago	26.00
Six to 12 inches, Chicago	24.00
Large sizes, Chicago	23.50
Six-inch, New York	20.00 to 20.50
Four-inch, Birmingham	19.50
Six-inch and larger, Birmingham	19.50
Gas pipe, $1 per ton higher than water.	

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.70c to 1.75c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.70c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.70c to 1.75c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh., St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	1.95c
No. 28 black sheets, Chgo	2.55c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chgo	3.55c
No. 28 galv. sheets, Cleveland	3.35c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.55c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 8.50 to 9.00
No. 1 railroad wrought, Cleve	9.25 to 9.75
No. 1 railroad wrought, St. L	7.50 to 7.75
No. 1 railroad wrought, Cincin	8.00 to 8.50
No. 2 railroad wrought, Chgo	8.00 to 8.50
No. 2 railroad wrought, St. L	7.25 to 7.50
Arch bars and transoms, Chgo	11.50 to 12.00
Arch bars and transoms, St. L	10.50 to 11.00
Knuckles, coup. & spr'gs, Chgo	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L	8.50 to 8.75
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	10.50 to 11.00
Steel car axles, Chicago	10.75 to 11.00
Steel car axles, St. Louis	10.50 to 11.00
Locomotive tires, Chicago	9.00 to 9.50
Locomotive tires, St. Louis	8.50 to 9.00
Cut forge, Chicago	8.00 to 8.50
Pipes and flues, Chicago	6.75 to 7.25
Pipes and flues, Cleveland	7.00 to 7.25

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—	
New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11.6 cents
Baltimore	14½ cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	46 cents

Pipes and flues, St. Louis	5.50 to 5.75
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	9.50 to 10.00
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.00 to 9.25
No. 1 busheling, Chicago	7.50 to 8.00
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	7.25 to 7.50
No. 2 busheling, Chicago	6.50 to 7.00
No. 1 boiler plate, cut, Chgo	5.50 to 5.75
No. 1 boiler plate, cut Buffalo	9.00 to 9.50
No. 1 boiler plate, cut, St. L	5.50 to 5.75
Boiler punchings Chicago	8.25 to 8.75
Cast borings, Chicago	5.00 to 5.50
Cast borings, Cleveland	5.75 to 6.00
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.00 to 4.50
Machine shop turnings, Chicago	5.25 to 5.75
Machine shop turnings, Cleveland	5.25 to 5.50
Machine shop turnings, Cinci	4.25 to 4.75
Machine shop turnings, St. L	4.50 to 5.00
Malleable agl., Chicago	$ 7.50 to 7.75
Malleable agricultural, St. Louis	6.00 to 6.25
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	6.50 to 7.00
Malleable, railroad, St. Louis	6.25 to 6.50
Angle bars, iron, Chicago	11.50 to 12.00
Angle bars, iron, St. Louis	9.50 to 10.00
Angle bars, steel, Chgo	8.00 to 8.25
Angle bars, steel, St. Louis	8.50 to 8.75
Stove plate, Chicago	8.25 to 8.50
Stove plate, Cleveland	7.50
Stove plate, Buffalo	9.00 to 9.75
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	7.00 to 7.25
Bundled sheet, Cincinnati	4.00 to 4.50

(Gross Tons.)

Heavy melting steel, Pbgh	$11.50 to 11.75
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chgo	9.00 to 9.50
Heavy melting steel, Cleveland	9.50 to 10.00
Heavy melting steel, Cincinnati	9.00 to 9.50
Heavy melting steel, eastern Pa.	9.75 to 10.00
Heavy melting steel, New York	7.50 to 7.75
Heavy melting steel, St. Louis	10.50 to 11.00
Bundled sheet, Buffalo	6.25 to 6.50
Grate bars, Buffalo	9.00 to 9.25
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	11.50 to 11.75
No. 1 railroad wrought, Pbgh	10.25 to 10.75
No. 1 R. R. wght., New York	9.00 to 9.50
No. 1 R. R. wrought, Buffalo	10.00 to 10.50
Shafting, New York	11.50 to 12.00
Shafting, eastern Pa.	13.50 to 14.00
Wrought pipe, New York	7.25 to 7.50
Wrought pipe, eastern Pa.	9.25 to 9.75
Mch. shop turnings, New York	5.00 to 5.25
Machine shop turnings, Buffalo	5.50 to 6.00
Mch. shop turnings, Pbgh	7.50 to 8.00
Mch. shop turnings, eastern Pa.	7.50 to 8.00
Cast borings, New York	5.00 to 5.25
Cast borings, eastern Pa.	7.50 to 8.00
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.00 to 8.50
Stove plate, (Jersey points)	8.00 to 8.50
Stove plate, Pittsburgh	8.50 to 9.00
Stove plate, eastern Pa.	8.50 to 9.00
Shoveling steel, Chicago	8.25 to 8.75
Shoveling steel, St. Louis	8.00 to 8.50
Reroll'g rails, 5 ft. & ov., Pbgh	11.50 to 12.00
Reroll. rails, 5 ft. & ov., Chgo	9.50 to 9.75
Reroll. rails, 5 ft. & ov., Cleve	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	10.50 to 11.00
Reroll. rails, 5 ft. & ov., St. L	9.75 to 10.00
Steel rails, short, Chicago	9.50 to 10.00
Steel rails, short, Cleveland	11.00 to 11.50
Steel rails, short, St. Louis	9.25 to 9.50
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Chgo	11.75 to 12.25
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	13.50 to 14.00
Iron rails, St. Louis	10.25 to 10.50
Iron rails, Pittsburgh	13.50
Frogs, switches, guards, Chgo	9.00 to 9.25
Frogs, switches & g'rds, St. L	9.25 to 9.50
Car wheels, (iron), Pittsburgh	10.50 to 11.00
Car wheels, (steel), Pittsburgh	11.50 to 12.00
Car wheels, Chicago	10.00 to 10.50
Car wheels, eastern Pa.	10.50 to 11.00
Car wheels, Buffalo	10.50 to 11.00
Car wheels, N. J. points	9.25 to 9.50
Car wheels, St. Louis	10.25 to 10.50
Iron axles, Pittsburgh	18.00 to 18.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Buffalo	19.00 to 19.50
Iron axles, Chicago	15.50 to 16.00
Steel car axles, New York	11.00 to 11.50
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.50 to 13.00
Steel car axles, eastern Pa.	13.00 to 13.50
No. 1 busheling, Buffalo	8.25 to 8.75
No. 1 busheling, Pittsburgh	8.50 to 8.75
No. 2 busheling, Buffalo	5.75 to 6.25
Low phosphorus steel, Buffalo	14.00 to 14.50
Low phosphorus steel, Pbgh	13.25
Low phos. steel, eastern Pa.	13.50 to 14.00
No. 1 forge, eastern Pa.	7.75 to 8.25
No. 1 cast, eastern Pa.	11.75 to 12.25
No. 1 cast, Pittsburgh	11.25 to 11.75
No. 1 heavy cast N. J. points	10.25 to 10.50
Mall. iron, R. R., Cleveland	9.25 to 9.75
Malleable railroad, Pittsburgh	10.00
Malleable, R. R., Buffalo	9.25 to 9.75
Malleable, R. R., east Pa.	8.00 to 8.50
Bundled sheet, Pittsburgh	8.75 to 9.25
Bundled sheet, Cleveland	7.50

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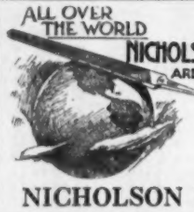

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(*Continued from page* 127.)

pilot piston, the speed of which is controlled by a water-resistance piston to which it is yoked. The resistance of the water piston is varied by constricting or enlarging the passage through which the water is forced to flow from one end of the cylinder to the other. Because of this arrangement, it is said that both hand and automatic control are easily accomplished.

Hardening Iron and Its Alloys

(*Continued from page* 134.)

velocity and thermal magnitude of the suppressed inversion, and the connection between these factors, crystal twinning and carbon percentage, is very evident.

At all the surfaces of slip upon which twinning occurs, amorphous layers are formed which are similar to those that Dr. Beilby has shown are produced when metals are deformed and hardened by cold-working. We consider that the ultimate cause of hardening by quenching steels is due to the presence of these amorphous layers. It thus follows that the final cause of hardening by quenching is exactly the same as that of hardening by cold-working, viz., the internal deformation of the crystals. The means by which this is brought about is, however, somewhat different.

In the case of the so-called austenitic steels, the special elements present give rise to the formation of new compounds, which, no doubt, owing to their molecular weight, exert a greater osmotic pressure when in the Gamma iron solid solution, and lower the temperature at which the carbon separates from solution. They also decrease the velocity of the carbide change. The action is such that rapid quenching is not necessary in order to preserve the mass in the same physico-chemical constitution as properly quenched carbon steels. In both cases the carbide change is inhibited by pressure, but when this is brought about by external means such as quenching, twinning of the crystals is produced, whereas, when the whole of the necessary pressure is already inherent in the mass, as osmotic pressure, no internal crystalline disturbance occurs.

The amount of twinning which is produced by quenching is proportional to the amount of the inversion which has to be suppressed by external means, or inversely proportional to the retarding influence of the special elements present. Hence twinning is entirely absent when the necessary internal pressure is sufficient, as when the required amount of nickel is contained in the steel.

We consider that these conclusions are in accordance with all known experimental data which have a bearing upon this particular phenomenon, and, further, they do not appear to totally exclude any theory which has been previously formulated. Indeed, we cannot refrain from saying that when carefully and impartially considered, each of those theories has some special merit, and it is sometimes a very difficult matter to decide at what stage one begins and another ends. In this connection, however, it is interesting to note that most of the important points of previous theories are in some form or another included in the above conclusions.

T. A. Willson & Co., Inc., have been awarded the grand prize at the second international exposition of safety and sanitation, which was held at the Grand Central Palace, New York, Dec. 12 to 19. This award is in recognition of the merits of the three styles of eye protectors sold by this company.

World's Supply of Platinum

The platinum industry, according to David T. Day of the U. S. geological survey, remains practically stationary with reference to the world's supply and the price. The supply from the well-known placers of Russia continues to decline slowly, but the uses for platinum do not increase sufficiently to cause the price to advance on account of the decline in supply. If more platinum were greatly needed, the supply could be augmented from California and Oregon.

Although the high price of platinum encouraged prospecting in the United States during 1913, the expected increase in the production of crude metal was not realized. The total production from California and Oregon amounted to 482.87 crude ounces and was valued at $18,477. Of this, 460.37 crude ounces came from California and were rated at 80 per cent fine—that is, it contained 368.3 fine ounces of platinum. That from Oregon—22.5 ounces—was not so carefully cleaned and was reckoned at 70 per cent fine, or 15.75 fine ounces of platinum. The greater part of the California platinum came, as usual, from the large gold-dredging operations in Butte, Yuba, Sacramento and Calaveras counties.

The question of a larger yield of domestic platinum depends principally upon working the Oregon and California beaches, including the old beaches now several miles inland and elevated considerably above sea level. Several machines involving somewhat fanciful or novel ideas were installed during 1913, as reported in the last review of this series. As a rule these machines were handicapped because they consisted either of competent concentrating apparatus without adequate means for digging the crude sand and delivering it to the concentrator, or, in other places, the reverse has been the case, and the machine, well suited for large-scale excavation at a low cost, has not been equipped with a proper system for concentrating these heavy sands after excavating them.

A sample of heavy concentrates from placer mining near Yacolt, Wash., on examination showed small quantities of gold and about one-sixth as much platinum as gold. No gold or platinum was found in any of the sand coarser than 100 mesh.

Refined Platinum

A considerable output of platinum is annually made in the United States from the refining of gold and copper bullion. A portion of this platinum originates in old scrap, sweepings, etc., sold by jewelers and dentists. About 650 fine ounces, however, were derived in 1913 as new metal from gold and copper bullion from domestic mines. No output of platinum concentrates was reported from platiniferous lodes of the United States in 1913.

In 1913 crude platinum sand was imported into the United States to the amount of 48,942 ounces. If the content of fine platinum in this sand is assumed to be 80 per cent, the approximate production of refined platinum in the United States in domestic refineries from foreign sands in 1913 was 39,154 ounces.

The ninth annual banquet of Brown-Wales Co., Boston, was held recently at the Harvard Club, all the officers, salesmen and office force being present. Like all previous affairs of this kind, it was a success. The president, Wm. Q. Wales, welcomed his associates. The business was established 44 years ago. The guest of the evening, Robert E. Sargent, New England manager of the Standard Sanitary Mfg. Co., Pittsburgh, delivered a very interesting and instructive talk.

The Southern Structural Steel Co., which went to the Birmingham district from Texas and which will manufacture cells, cages and all kinds of work for jail interiors, is expected to begin operation within a few days.

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Men Wanted
Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

Position Wanted
Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word. 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Remittance should be made to cover eight (8) words for address if box number is used.

Men Wanted

UNDERSIGNED COUNSEL WILL CONFIDENTIALLY negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $3,000 to $12,000 men. Send address only for explanation. R. W. Bixby, Lock Box 134-E9, Buffalo, N. Y.

WANTED:—A LIVE FOUNDRY FOREMAN for gray iron foundry located in small town in south. Must be thoroughly familiar with machine molding and be able to get results. Permanent employment. Write fully stating salary expected, experience, etc. Address Box 301, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — MAN EXPERIENCED IN soliciting work, to solicit for gray iron foundry making light castings up to 500 pounds. Give references. Address Box 303, THE IRON TRADE REVIEW, Cleveland, O.

THE BEST WAY TO GET A GOOD POSITION in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

PRACTICAL MAN, WITH EXECUTIVE ability, to systematize gear manufacturing plant. Permanent employment if satisfactory. Address Box 312, THE IRON TRADE REVIEW, Cleveland, O.

PATTERN SHOP FOREMAN WANTED; Experienced man to take charge of the wood and metal pattern department in a large stove plant. Must be a capable designer with a wide experience in stove construction, match plate and molding machine work. Good salary to the right man. Address Box 314, THE IRON TRADE REVIEW, Cleveland.

WORKING BRASS FOREMAN WANTED at once; must be thoroughly experienced, progressive and conversant with mixing of metal for stop and waste cocks; state salary and furnish references. Address Box 315, THE IRON TRADE REVIEW, Cleveland, O.

A THOROUGHLY COMPETENT OPEN-hearth furnace man, familiar with the making of both acid and basic open-hearth steel, to take charge of a small furnace; must have some knowledge of chemistry. In replying give experience, age, last place of employment, etc. Address Box 316, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

WANTED: — POSITION AS SUPERIN-tendent or foreman by a thoroughly practical and capable man of 20 years experience in erecting iron stairways, railings, store fronts and general ornamental iron work. Address Box 108, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

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OFFICE MANAGER, FACTORY OR cost accountant, 30 years of age with 12 years practical experience, capable to analyze, install or perfect complete factory system. Highest testimonials. Address Box 254, THE IRON TRADE REVIEW, Cleveland, O.

GENERAL SUPERINTENDENT OF blast furnace and coke oven plant, 1,000,000 tons pig iron capacity, and manager of fabricating shop, 60,000 tons capacity, good organizer of men and efficiency methods, low cost records. 20 years' practical experience in designing, erecting and operating desires to connect with firm on salary and bonus basis. Best of references. Address Box 257, THE IRON TRADE REVIEW, Cleveland, O.

I DESIRE TO REPRESENT THE MAN-ufacturer in Pittsburgh district. I have 15 years' experience as salesman in mill supply line. Correspondence solicited. Address Box 299, THE IRON TRADE REVIEW, Cleveland, O.

BLAST FURNACE SUPERINTENDENT; young man (31); eleven years' practical blast furnace experience, technical chemist and metallurgist; aggressive, energetic and competent; can combine quality, quantity and low costs. Address Box 305, THE IRON TRADE REVIEW, Cleveland, O.

STEEL WORKS CHEMIST; GRADUATE, experienced in alloy steel; desires charge of laboratory or first assistant's position; cannot accept less than $150 and can earn it; would prefer position that requires some outside work, especially about the open-hearth. Address Box 308, THE IRON TRADE REVIEW, Cleveland, O.

MASTER MECHANIC OR MACHINE shop foreman wants position; 29; married; technical education; 12 years' experience rolling mills and blast furnaces; best references. Address Box 313, THE IRON TRADE REVIEW, Cleveland, O.

EMPLOYERS DESIRING TO INCREASE efficiency in office, shop or factory, will be able to make known this fact to better advantage by placing a classified ad in THE IRON TRADE REVIEW than through any other means.

POSITION WANTED BY MAN 34 years of age. Honest, sober, industrious, with energy and executive ability as purchasing agent, advertising or publicity man, charge of cost work, salesman, stock keeper, time keeper, paymaster, soliciting foundry trade, shipping clerk, correspondent, road salesman, inspector. Expert on sand handling equipment, cleaning equipment and dust arrester equipment of all kinds and the installation of the same, as well as expert on preparing molding and core sands. Familiar with most up-to-date ways of treating sand. General knowledge of foundry practice and machine shop work. Address Box 318, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS SALESMAN for foundry supply house. Expert on sand mixing and blending. Thoroughly familiar with molding and core sands, cleaning and dust arrester equipment. Have a general all around knowledge of foundry practice of all kinds and have a large acquaintance among foundrymen. Honest, sober, industrious and energetic. Know how to build up trade and keep it. Address Box 319, THE IRON TRADE REVIEW, Cleveland, O.

Employment Agencies

SUPERINTENDENTS, SPRAYERS, pumps, stanchions, $150; heavy sheet metal, also designer, $125; foundry pumps, $150; malleable, $350; sheet metal gas ranges, $200; small engines, $200; foremen steel lockers, $100; stairs, structural, $130; heavy machinery, $150; metal furniture, $150; press room, $100; chief engineer oil engines, $300; chief draftsman sheet metal manufacturing as shears, presses, tinsmith's machines, $250. Efficient Service Co., 53 W. Jackson, Chicago, Ill.

Wanted

WANTED TO HEAR FROM OWNER OF good hardware or implement store for sale. Send price and particulars. D. F. Bush, Minneapolis, Minn.

For Sale

QUICK CASH SALE TAKES BRASS foundry equipment; used only a short time; everything like new; inventories $4000.00; a real bargain. Address Box 317, THE IRON TRADE REVIEW, Cleveland, O.

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